A survey in the Jabbul Plain

Gerritsen, F.A.; MacCormack, J.A.; Schwartz, G.M.

published in
American Journal of Archaeology
2000

DOI (link to publisher)
10.2307/507225

document version
Publisher's PDF, also known as Version of record

Excavation and Survey in the Jabbul Plain, Western Syria: The Umm el-Marra Project 1996–1997

GLENN M. SCHWARTZ, HANS H. CURVERS, FOKKE A. GERRITSEN, JENNIFER A. MACCORMACK, NAOMI F. MILLER, AND JILL A. WEBER

Abstract

The 1996 and 1997 seasons of the Hopkins-Amsterdam project in the Jabbul plain, western Syria, have generated new results on Bronze Age urbanism at Tell Umm el-Marra and elucidated longer-term settlement patterns in the Jabbul region. Excavation results have documented the foundation of Umm el-Marra as a regional center in the Early Bronze Age, provided new data on a period of decentralization in Middle Bronze I, and supplied evidence of the regeneration of urbanism in MB II. Faunal and archaeobotanical analysis broaden our understanding of these developments, attesting to an economy overwhelmingly dependent on the steppe environment, with an emphasis on large-scale onager hunting in MB II. Finally, a regional survey provides data on long-term demographic and socioeconomic trends, furnishing an expansive time range and spatial context for our understanding of developmental patterns in the region. The survey results supply new information on the limits of the Uruk expansion, cycles of Bronze Age urbanization, changing patterns of steppe exploitation, and demographic and agricultural extensification in the Byzantine and Early Islamic periods.*

INTRODUCTION

In recent years Syria and upper Mesopotamia have served as an important laboratory of research on early Near Eastern complex societies, providing a counterpoint and complement to their well-known neighbor southern Mesopotamia, the so-called cradle of civilization. Investigation of the development of urban societies in this region serves to expand our appreciation of early urban variability, allowing us to progress beyond assumptions of ancient Near Eastern urbanism as a uniform phenomenon.[1]

In the Johns Hopkins–University of Amsterdam Umm el-Marra project, we aim to investigate the early history of complex societies in western Syria, a relatively underinvestigated region whose potential has been amply demonstrated by the results from Ebla (Tell Mardikh). Conceived as a long-term program of archaeological research in the Jabbul plain,[2] the project's primary goal is the investigation of the developmental trajectory of complex societies in the region in the Early, Middle, and Late Bronze periods (ca. 3000–1200 B.C.). Moving beyond the traditional emphasis on the elite and monumental, we aim to focus on domestic as well as public contexts, lower social strata as well as elites, issues of economy and subsistence as well as political history, and regional issues as well as site-specific problems.

*We wish to express our gratitude to the Directorate-General of Antiquities and Museums, Syria, for its continued support and encouragement of the Hopkins-Amsterdam joint expedition to Umm el-Marra, with especial thanks to Sultan Muhesen, Director-General, Adnan Bounni, Director of Excavations during the 1996–1997 field seasons, and Wahid Khayata, Director of the Aleppo Museum. We are also grateful for the valuable assistance provided by our departmental representative Mahmud Hamoud and by our site guard Muhammad Qasem al-Helu and his family. In the 1996 and 1997 seasons, support was provided by the National Geographic Society, the Arthur and Isadora Dellheim Foundation, the Johns Hopkins University, and other contributors. The 1996 team included Glenn Schwartz and Hans Curvers, codirectors; Sally Dunham, site supervisor, small finds analyst, and survey team member; Fokke Gerritsen and Jennifer MacCormack, survey organizers and supervisors; John Nichols and Alice Petty, site supervisors and survey team members; Ghada Saad and Juliette Elias, site supervisors; Nel Loosbroek, ceramics analyst; Klaas van Harten, architect and photographer; Grace Brush, palynologist; and Timothy Beach and Sheryl Luzzader-Beach, geomorphologists. The 1997 team included Glenn Schwartz and Hans Curvers, codirectors; Sally Dunham, site supervisor and small finds analyst; Ryan Byrne, Matthew Johnson, John McHugh, John Nichols, Alice Petty, and Daniel Rogart, site supervisors; Jill Weber, zooarchaeologist; and Nel Loosbroek, ceramics analyst. We are indebted to Jerrold Cooper, Sally Dunham, Nicolo Marchetti, Lorenzo Nigro and Gil Stein for many useful ideas and references. We dedicate this contribution to the memory of Muhammad Lahluh, our representative for the 1994–1995 seasons and a friend whose warmth, collegiality, and wisdom will be much missed.

Authors responsible for specific sections are as follows: "Introduction," G.M. Schwartz; "Architecture, Stratigraphy, and Pottery," G.M. Schwartz and H.H. Curvers; "Animal Exploitation," J.A. Weber; "Plant Remains," N.F. Miller; "A Survey in the Jabbul Plain," F.A. Gerritsen, J.A. MacCormack, and G.M. Schwartz; "Conclusions," G.M. Schwartz and H.H. Curvers.

[1] Stein 1998, 14–6.

[2] Curvers and Schwartz 1997, 201–39. Our work follows the groundbreaking efforts of the Belgian team directed by R. Tefnin that conducted the first excavations at Umm el-Marra in the 1970s and 1980s and at Abou Danné to the west.

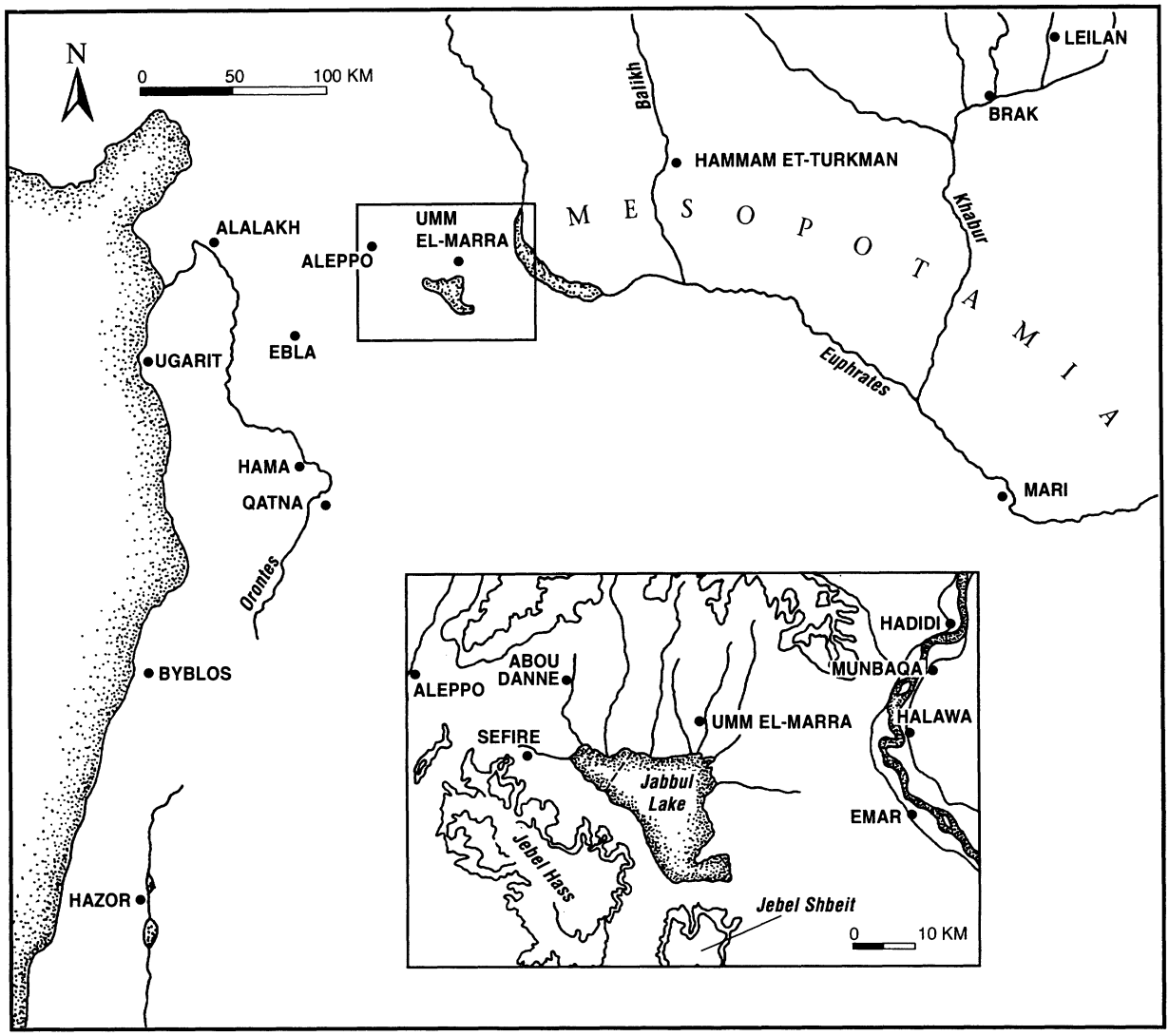

Fig. 1. Map of Syria with Jabbul plain inset

Located between Aleppo and the Euphrates valley, the Jabbul plain served historically as an important conduit between western Syria and Mesopotamia (fig. 1). Our research locus, Tell Umm el-Marra (fig. 2), is the largest Bronze Age site in the Jabbul (ca. 25 ha) and is perhaps to be identified as ancient Tuba. The first stage of the project (1994–1995) consisted of broad horizontal excavations in five major areas and two perpendicular transects of 2 × 2 m excavated squares. In general, these results revealed a sequence of EB, MB, and LB phases succeeded, after a hiatus, by Hellenistic and Roman settlement (table 1). Large exposures were obtained for the LB and MB II periods,[3] revealing a predominance of small-scale domestic architecture in LB and greater evidence of public constructions and the presence of a central authority in MB II. Only limited exposures were obtained from EB contexts.

In May–July 1996 and 1997, we implemented the project's second research stage, with the following goals: broadened exposure of EB remains and investigation of the EB–MB transition, sampling of previously uninvestigated components of the site, intensified analysis of archaeobotanical and faunal data, and initiation of regional and environmental studies.

For consideration of the EB and the transition to MB, we were interested in three main problems.

[3] We follow the Ebla team in its designation of Mardikh IIIA and related assemblages as MB I (ca. 2000–1800 B.C.) and Mardikh IIIB as MB II (ca. 1800–1600 B.C.). Matthiae 1997b, 1–29.

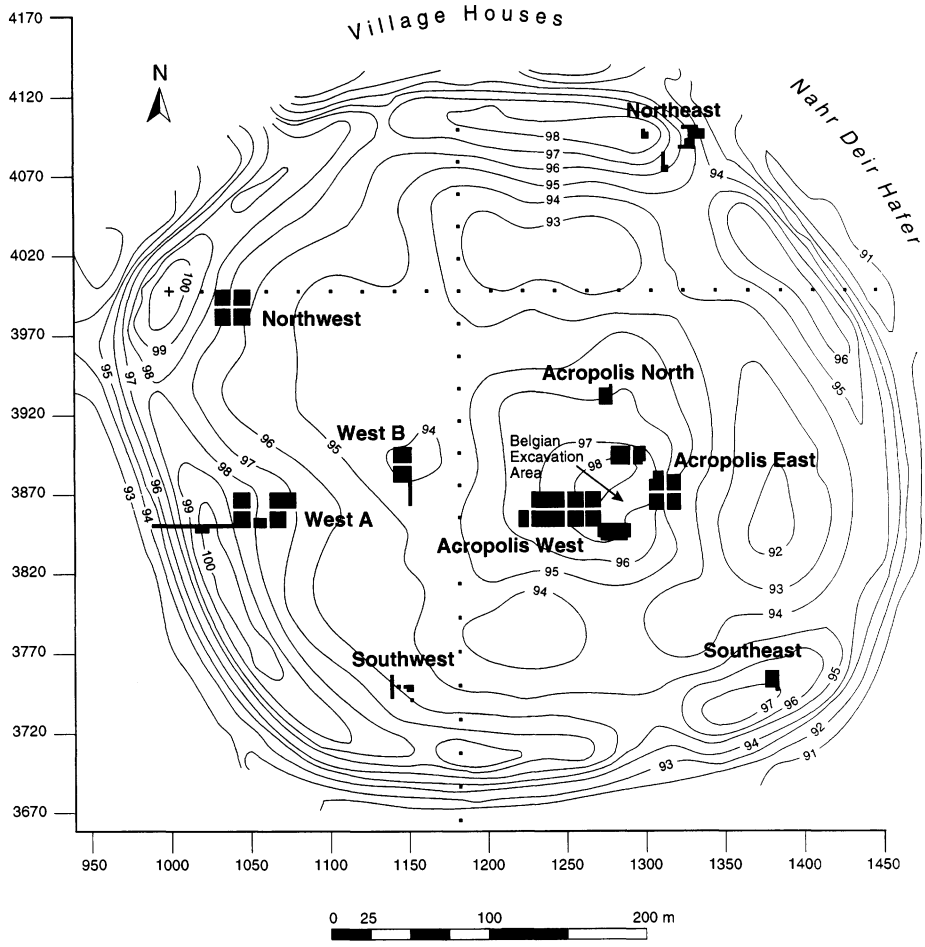

Fig. 2. Tell Umm el-Marra

First is the emergence of complex, urbanized society in the Syrian EB ca. 2600–2500 B.C., an issue that has received considerable attention for the Syrian Jezireh but less so in the west, with the notable exception of Ebla. Explanatory paradigms advanced for this phenomenon have focused on the effect of southern Mesopotamian contacts, the mobilization of agricultural surpluses by emerging elites, and the role of wealth, finance, and international trade, but more data and models of greater sophistication are needed.[4]

Second is the hypothesized collapse of urban societies at the end of the EB. Since it has become apparent that complex societies are not inherently stable systems but are subject to episodes of instability and decentralization, collapse has become an issue of great interest in the study of early complex societies. The precise character, explanation, and even existence of urban collapse at the end of the Syrian EB, however, is a subject of considerable debate.[5] At present, we can observe large-scale desertion of sedentary occupations in the upper and lower Khabur regions, reduction or abandonment of urban centers in the middle Euphrates, and significant material culture breaks in western Syria (e.g., Hama). In the early second millennium (= MB I in western Syria, ca. 2000–1800 B.C.), evidence from the middle and upper Euphrates indicates that small, self-reliant communities survived in an environment largely devoid of urban centers and regional site hierarchies.[6]

Our third problem of interest concerns the next

[4] Weiss 1983, 39–52; Schwartz 1994, 153–74; Peltenburg et al. 1996, 1–28.

[5] Weiss et al. 1993, 995–1004; Wilkinson 1997, 67–106.

[6] van Loon 1992, 103–7; Cooper 1998, 271–80 ; Wilkinson 1990; Weiss et al. 1993. Possible exceptions to the pattern of early second-millennium B.C. decentralization in Syria can be cited at Ebla, which seems to have experienced significant power and prosperity in MB I, and *shakkanaku* period Mari.

Table 1. Umm el-Marra Relative Chronology

Chronological Period	Umm el-Marra Period	Absolute Date
Roman	Ia	ca. 50 B.C.–400 A.D.
Hellenistic	Ib	ca. 400–50 B.C.
LB	II	ca. 1600–1200 B.C.
MB II (Mardikh IIIB)	IIIa–c	ca. 1800–1600 B.C.
MB I (Mardikh IIIA)	IIId	ca. 2000–1800 B.C.
EB IVB (Mardikh IIB2)	IV	ca. 2300–2000 B.C.
EB IVA (Mardikh IIB1)	V	ca. 2500–2300 B.C.

"turn" of the developmental cycle: how do complex societies revive and regenerate themselves after urban and state disintegration? And why do some societies recentralize while others do not? To address this issue, we aim to investigate the resurgence of complex, urban societies by the MB II period (ca. 1800–1600 B.C.), when powers like Yamhad, Mari, and the extensive kingdom founded by Shamshi-Adad emerged. While discussions of the regeneration of complex societies are still in their infancy, several approaches have been offered. In her review of the life histories of urban-based Mesoamerican states, J. Marcus observes that such entities typically expanded early in their lifespans, after which provincial centers broke away and eclipsed their former overlords, becoming the capitals of new and more powerful states.[7] The Syrian data, however, do not conform comfortably to this model, since MB political centers largely replicate those of EB. Other approaches hypothesize a survival of diverse aspects of state societies in the period of collapse, allowing for their subsequent reconstitution. G. Schwartz, for example, has advanced a model for the period following the Uruk expansion in Syria in which lower-level administrative structures survived as smaller, simpler polities that re-formed into states through competition and conflict.[8] P. Wattenmaker hypothesizes that state economic and ideological structures (e.g., economic specialization) survived state disintegration in post-EB eastern Anatolia, allowing for the eventual resurgence of state societies.[9] Arguing along similar lines, Graffam proposes that the smaller-scale polities that emerged after the collapse of the Tiwanaku state retained and intensified organizational strategies of the collapsed state.[10]

Individual variables that also may have been instrumental in the regeneration of complex societies in MB Syria include economic or political stimuli from foreign complex societies in a "repeat" of secondary state formation,[11] enhanced climatic conditions facilitating a regeneration of elite power based upon renewed agricultural surpluses,[12] new technologies, and the importance of newly powerful ethnic groups such as the Amorites.

Apart from these specific research foci, the broad time span afforded by survey results and the occupation sequence at Umm el-Marra allows for a consideration of long-term developments in the region and site. In this context, the shifting cycles of urbanization and deurbanization, and centralization and decentralization can be studied over the *"longue durée."*

The following report presents the results of the 1996–1997 seasons of excavation and survey. The discussion of architecture, stratigraphy, and pottery, while decidedly preliminary, provides data on the foundation of the site in EB and on the transition from EB to MB, allowing for a consideration of urban collapse and revival. Botanical and faunal analyses address similar developmental issues; they are also significant as the first studies of ancient plant and animal utilization in the Jabbul. Widening our focus, the survey data supply a broader chronological and spatial range for the consideration of changes in human societies in the Jabbul.

ARCHITECTURE, STRATIGRAPHY, AND POTTERY

Excavation Areas with EB to MB Sequences

Excavations retrieving evidence of EB, the earliest period of occupation at Umm el-Marra, were located in the Acropolis East, Acropolis West, and West Area A (City Wall Trench). Each area provid-

[7] Marcus 1989, 201–8; Marcus 1992, 392–411; 1998, 59–94.
[8] Schwartz 1994, 153–74.
[9] Wattenmaker 1994, 193–208.
[10] Graffam 1992, 882–904.
[11] Gerstenblith 1983.
[12] Current evidence, however, suggests continued desiccation in the second millennium. Cf. Wilkinson 1998, 63–87.

Fig. 3. Umm el-Marra IV ("EB IVB") architecture, Acropolis East unit 1314/3870, EB phase a, with test trench along south balk. The view is toward the southwest.

ed differing patterns of EB urbanism and decline and of MB revival.

Acropolis East: EB, MB II, and an Intervening Hiatus. The Acropolis East produced a sequence of EB and MB II levels with a conspicuous occupational gap in between. In this area, excavations were conducted in two 8 × 10 m units that had yielded LB and MB II phases in the 1995 season (1314/3882 and 1314/3870).[13]

Immediately below the MB II levels excavated in 1995, we encountered domestic architecture associated with EB ceramics of the late third millennium BC (Umm el-Marra IV). This result suggests a hiatus of two centuries or more in the occupation of the Acropolis East. In the latest EB phase a, the southern excavation unit (1314/3870) contained at least seven rooms of residential character with pottery vessels and other domestic paraphernalia such as grinding stones and spindle whorls in situ (fig. 3).[14] Debris outside one of the rooms yielded a flat-bladed leaf-shaped copper/bronze dagger and two apparent chisels. In contrast to the architecture exposed in the southern unit, an open space of pits and midden strata were contemporary with phase a in the northern unit.

The ceramic assemblage associated with phase a (fig. 4) included "EB IVB" types comparable to those found at Mardikh IIB2, Amuq J, and late Selenkahiye such as goblets with collared necks (fig. 4.1), shallow bowls with vertical rims (fig. 4.8), brown platters with pitted bases,[15] Painted Simple Ware caliciform goblets (fig. 4.2–3), and Smeared Wash Ware, in addition to more general later third-millennium (EB IV) types, such as gray spiral burnish ware (fig. 4.4), corrugated caliciform goblets,[16] and cooking ware jars with triangular lugs (fig. 4.11).

In the preceding EB phase b, domestic structures with lime-plastered floors sometimes installed above a layer of cobbles were identified both in the northern and southern excavation units, with an open zone in between. Four earlier phases (c–f) were uncovered in limited soundings in the southern excavation unit associated with mid/late third millennium pottery (Umm el-Marra V–EB IVA and perhaps earlier) including fine thin-walled sherds with painted horizon-

[13] In 1997 removal of MB II domestic architecture previously exposed in the northern unit 1314/3882 (Curvers and Schwartz 1997, fig. 10, rooms 6–7) revealed a piglet skeleton below the house walls and the pit burial of an infant in the area south of room 7.

[14] Almost all the excavated architecture referred to in this report consisted of stone substructures with mudbrick superstructures. In the Acropolis East EB architecture, however, only occasional vestiges of mudbrick superstructures were encountered.

[15] Braidwood and Braidwood 1960, fig. 334.23–26.

[16] Braidwood and Braidwood 1960, fig. 338.15–16.

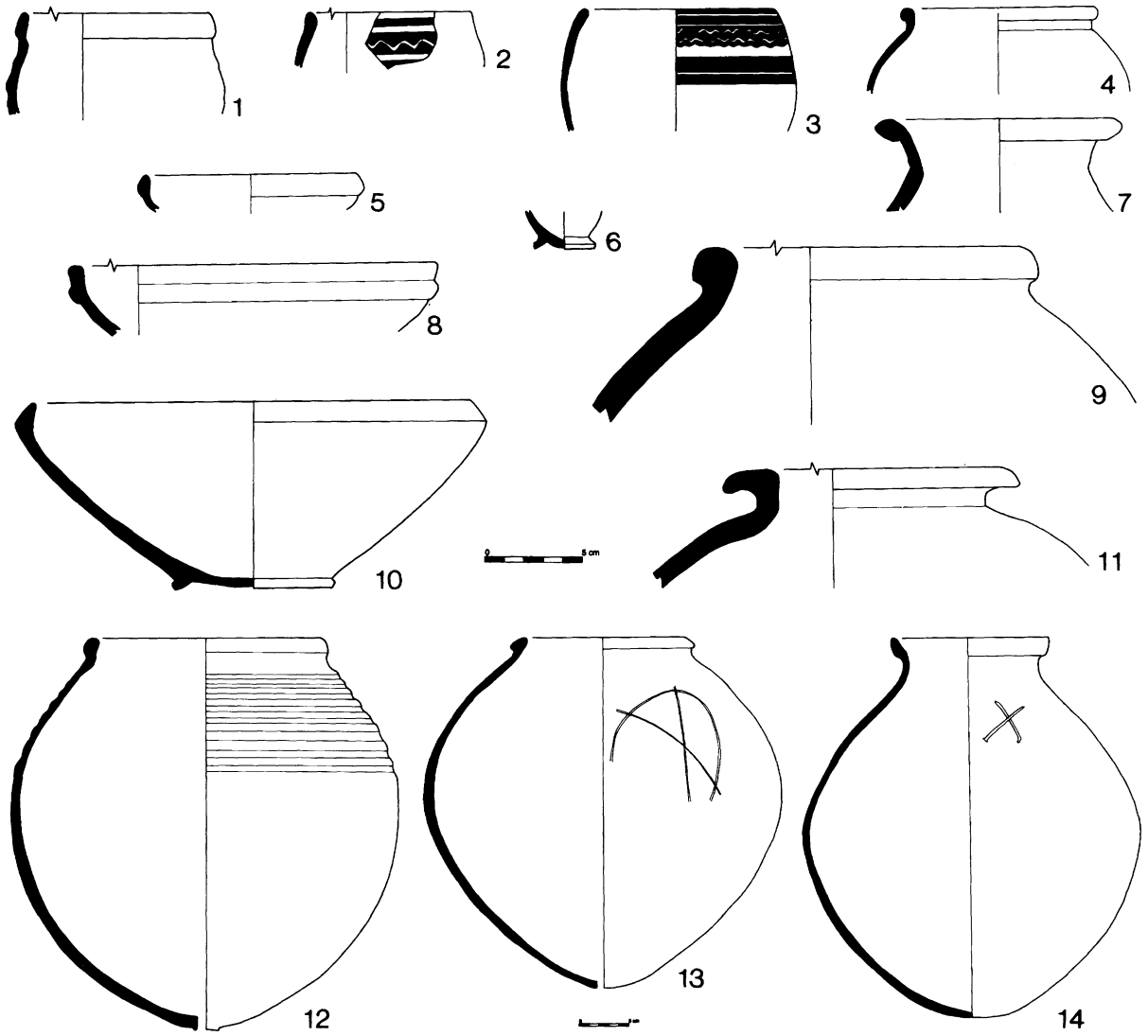

Fig. 4. Umm el-Marra IV ("EB IVB") pottery, from Acropolis East unit 1314/3870 EB phase a floors: *1*, light yellow, fine sand, wheelmade; *2*, light yellow, no temper, wheelmade, black paint; *3*, light brown to yellow, fine white sand, red-brown paint with incised undulating lines; *4*, gray spiral burnished, fine/medium sand, wheelmade; *5*, light green/yellow, fine lime, wheelmade; *6*, light yellow slip exterior/interior, core light brown, fine white sand, wheelmade; *7*, light yellow slip exterior/interior, pink core, fine sand, wheelmade; *8*, light yellow slip exterior/interior, core yellow/brown/pink "sandwich," fine sand; *9*, light yellow, fine sand with chaff, coarse lime, wheelmade; *10*, pink-brown, fine sand, wheelmade; *11*, brown cooking ware, exterior burnished, fine/medium sand, rim preserved only at triangular lug; *12*, light green to yellow exterior slip, pink to green-yellow core/interior, fine sand, wheelmade, exterior ribbed, base perforated; *13*, light red-brown; core light red-brown/brown/light red-brown "sandwich," fine white sand, three sets of two mend holes with bitumen below shoulder, incised pot mark, perforated base; *14*, red-brown exterior/interior, light gray core, fine white sand, neck wheelmade, incised pot mark.

tal bands.[17] Sterile red soil was encountered below phase f, ca. 6 m below the present-day mound surface, indicating an approximate mid-third millennium date for the earliest occupation of the area.

Both the phase a domestic architecture and the "southern house" of phase b had the distinctive feature of small circular lime-plastered pits (26–60 cm in diameter) underneath the house floors. Two of these pits, each associated with a different construction episode of the phase b southern house, contained segments of broken clay figurines (figs. 5, 6).[18] This discovery is of significance given the

[17] The pottery variously designated "Red Banded Ware," "Euphrates Banded Ware," or "Metallische Ware mit Streifenbemalung." Cf., e.g., Jamieson 1993, 36–92.

[18] One of the three subfloor pits in the large eastern room of the phase b southern house contained the broken head and body of a male anthropomorphic figurine (fig. 5). A pit associated with the reconstruction of the western room, sunk into a wall of the earliest construction episode, included four figurine fragments and a model wagon fragment (fig. 6).

Fig. 5. EB figurine (UMM96 H-009) from small lime-plastered pit, Acropolis East unit 1314/3870, 2 × 2 m square 1316/3864, EB phase b

usual recovery of such figurines in secondary or tertiary contexts.[19] In this case, one might hypothesize that the figurines were deposited in rituals intended to protect the house from evil, on analogy with subfloor deposits known from much later periods. If the figurines were used for apotropaic rituals, one might expect that they were ritually broken, but we could not discern whether the breakage was deliberate.[20] An alternative interpretation might entail the pious burial of divine images revered by individual households.[21]

Acropolis West: MB I Occupation. In the Acropolis West area, excavations were renewed in the 10 × 20 m trench 1228/3860, where the 1995 excavations had revealed MB II domestic architecture. Below the MB II houses was a 0.8–1.9 m deposit of ashy strata associated with MB II sherds.

Given the results from the Acropolis East, we had expected to encounter third millennium (EB) remains directly below MB II. This expectation was confounded, however, by the appearance of two architectural phases with pottery of the early MB period (MB I = Mardikh IIIA, Umm el-Marra IIId). We conclude, therefore, that some parts of the site (e.g., Acropolis East) were abandoned in the early second millennium, while others remained occupied in this transitional period. The later of the two MB I phases included a multiroom rectilinear house (fig. 7) and an open area to its north.

The MB I pottery included large closed vessels with a thick everted rim and a horizontal raised ridge below the neck (fig. 8.1–4). Attested with some frequency are comb-incised decorations, including a distinctive design consisting of alternating horizontal registers of undulating lines, horizontal combed bands, and diagonal lines of punctate incisions (fig. 8.12). Thin-walled goblets with a slightly rounded biconical shape and everted bead rim were also common (fig. 8.8–9). Shallow carinated bowls with thick walls and triangular rims formed another frequent type (fig. 8.10–11), and cooking pots had angular everted necks, as in later MB contexts at Umm el-Marra.[22] Painted sherds belonged to the Syro-Cilician group well-known from Alalakh as well as other west Syrian categories (fig. 8.13–16).[23]

Below the MB I occupation were late EB strata (Umm el-Marra IV and perhaps V). Most of the excavated area had no visible architectural traces, but two building phases were noted on the east and northwest. Excavation below the earlier EB architectural phase in the east yielded hard red soil with-

[19] Although they are usually found out of context, examples of figurines discovered in situ are attested in houses at Selenkahiye on the middle Euphrates, east of Umm el-Marra. Anthropomorphic figurines were found under room floors in three cases, inside a room niche, and below a doorsill (van Loon 1973, 148; 1979, 99–103).

[20] According to Voigt's cross-cultural survey, complete or fragmentary figurines used as vehicles of sympathetic magic "may be deposited within the fabric of domestic structures (within walls or floors, beneath floors, especially at thresholds)," (Voigt 1983, 190). For Neo-Assyrian epigraphic and archaeological data concerning the ritual burial of apotropaic figures below house floors, see Wiggermann 1992; Green 1983, 87–96. Note also the discovery of unbaked fragmentary clay figurines and miniature vessels below the floor of the main hall in the LB Hammam et-Turkman VIII palace, interpreted as an apotropaic or votive deposit (Rossmeisl and Venema 1988, 571–3).

[21] For this interpretation, see Liebowitz 1988, 27–32; van Loon 1973, 148.

[22] Curvers and Schwartz 1997, fig. 24.7.

[23] Tubb 1983, 49–62. While there are points of general similarity, the assemblage departs in some ways from that of Mardikh IIIA, suggesting regional differentiation. E.g., the carinated bowls with concave upper bodies so common at Ebla are absent at Umm el-Marra. Comparing the Umm el-Marra MB I assemblage with that of Ebla, L. Nigro (pers. comm.) identified many Ebla MB IB types (ca. 19th century B.C.), as well as MB IA examples (ca. 20th century B.C.). Cf. Nigro 1998a, 271–304; 1998b.

Fig. 6. Objects from small lime-plastered pit, Acropolis East unit 1314/3870, 2 × 2 m square 1314/3864, EB phase b. Clockwise from left: torso of stalk figurine (UMM96 H-012, 5.0 × 3.6 × 1.1 cm); figurine with necklace (UMM96 H-007, 7.7 × 8.1 × 1.8); model wagon fragment (UMM96 C-001, 8.2 × 4.7 × 1.7 cm); quadruped figurine (UMM96 A-8, 6.4 × 5.6 × 2.8 cm) and head (UMM96 H-011, 3.0 × 2.4 × 2.5 cm).

out any sherds; whether this represents virgin soil requires further investigation but seems likely. If so, the third-millennium occupation in the Acropolis West area consisted of far fewer building phases than the Acropolis East, providing further evidence of variability in the occupation histories of the two areas.

City Wall Trench, West Area A. Significant results were obtained with respect to the fortification of the site in the EB and MB periods in West Area A. Investigation of the history of the city wall area, begun in 1995, continued in 1996 and 1997 with the extension of a 2 m wide east–west step trench 52 m from the top of the rampart area to the base of the tell slope (fig. 9). The trench was enlarged to a width of 5 m in the vicinity of a mudbrick pottery kiln.

While we had previously concluded that red and brown vertically oriented bricks distributed along 7 m of the 2 m-wide trench were fallen remnants of an MB II city wall,[24] the 1997 excavations revealed a layer of upright gray bricks below them oriented in a direction perpendicular to the bricks above. Such a situation indicates a deliberate construction rather than a collapsed wall. As a result, we now interpret the evidence in terms of an MB II city wall consisting of alternate courses of bricks standing vertically, a technique attested from a diversity of third and second millennium contexts elsewhere.[25] No evidence of any LB fortification has been detected.

Downslope and to the west of the mudbricks, excavation recovered evidence of two earth and pebble glacis constructions built against what appears to be an earthen rampart dating to the EB period. The latter construction had a clearly defined, smooth upper surface and consisted of brown soil with pebbles and regularly spaced lenses of ash sloping down from east to west at a 45° angle. The EB date of this feature is clear, since the firebox of a pottery kiln containing EB ceramic wasters was dug into it. Because our data currently indicate that Umm el-Marra was founded in the mid-EB period, the evidence of this rampart may suggest that the site became a large and circumvallated center early in its history.

[24] Curvers and Schwartz 1997, 215.

[25] Cf., e.g., the Nippur Ur III Enlil temple, level V (McCown and Haines 1967, 6, pls. 7B, 25.2,3); an early second-millennium mudbrick platform from al-Hiba (Hansen 1978, 77–8); and the EB fortification wall at Jerablus Tahtani (Peltenburg 1997, 122).

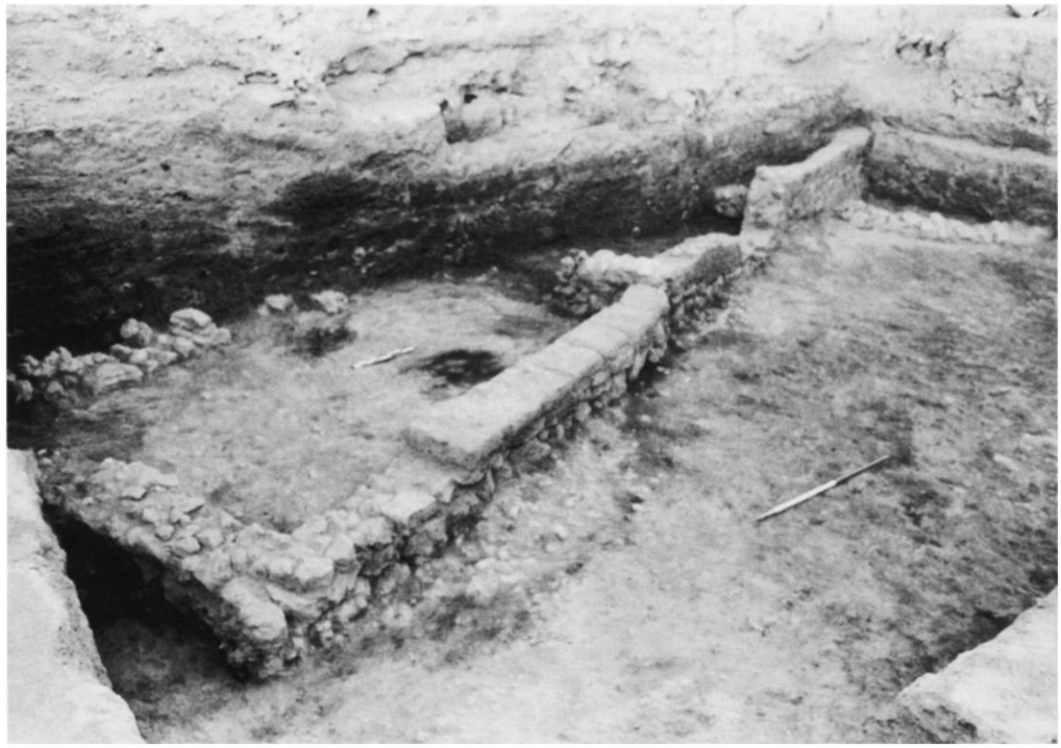

Fig. 7. MB I (Umm el-Marra IIId) house, Acropolis West unit 1228/3860. The view is toward the southwest.

The earlier of the two glacis constructions, designated the "red" glacis because of its reddish-brown soil, was built up against the outer face of the EB rampart (see fig. 10). This structure had a battered (i.e., outward sloping) revetment of stone boulders at its outer base standing 1.4 m high and 1.6 m thick, and horizontal "tongues" of gray clay were noted inside the exterior face of the glacis above the revetment. The later, or "white," glacis, so called because of its lenses of white limestone fragments and pebbles, was constructed against the red glacis. Like the latter feature, the white glacis had a stone revetment, measuring ca. 1.5–2.3 m high and 5.3 m thick, but the outer face of the revetment was not battered or sloping. Excavation on the inside of both revetments indicated that they consisted of boulders and cobbles heaped up against the earth and pebble material of the glacis and were not walls with flush interior faces. The reddish, chalky soil or white limestone materials in the glacis constructions were probably dug just outside of the tell, resulting in the ditch or moat now encircling the site.[26]

Dating the two glacis constructions is difficult at present. Although it contained only EB sherds (EB IV, without any evidence of IVB types), the soil from the constructions might have been removed from elsewhere in the tell and need not signify an EB date.[27] Since the red glacis appears to have been installed subsequent to the construction of the EB pottery kiln, is heaped against the EB rampart, and is unlikely to postdate the MB II city wall (see fig. 9), a late EB to MB II date is indicated. The white glacis must postdate the red glacis. Given the numerous parallels for similar constructions in both EB and MB, stylistic or architectural comparanda do not resolve the issue.[28]

[26] Moats or ditches surrounding third- and early second-millennium urban sites in Syro-Mesopotamia have been identified at sites like Ebla, Selenkahiye, Titrish, Chuera, and Leilan.

[27] In addition to red material with the appearance of natural, virgin soil ostensibly from outside the tell, the glacis constructions also contain ashy organic material presumably from the tell itself. The freestanding rampart at Ebla, dated to MB I, has a similar composition (Matthiae 1997a).

[28] For MB glacis examples, see especially Gezer (field IV), which has "tongues" of clay, and Abou Danné, west of Umm el-Marra in the Jabbul (Seger 1978, 34–45; Tefnin 1979, 49). EB glacis or earthen rampart constructions have been observed at numerous sites in Syria, including Chuera, Bderi, Rad Shaqrah, Ziyadeh, and Mulla Matar; EB stone revetment walls similar to those at Umm el-Marra occur at Jerablus Tahtani, Tell el-ʿAbd, and Tell Sweyhat (Peltenburg et al. 1997; Finkbeiner 1995, 56; Zettler 1997, 49–51).

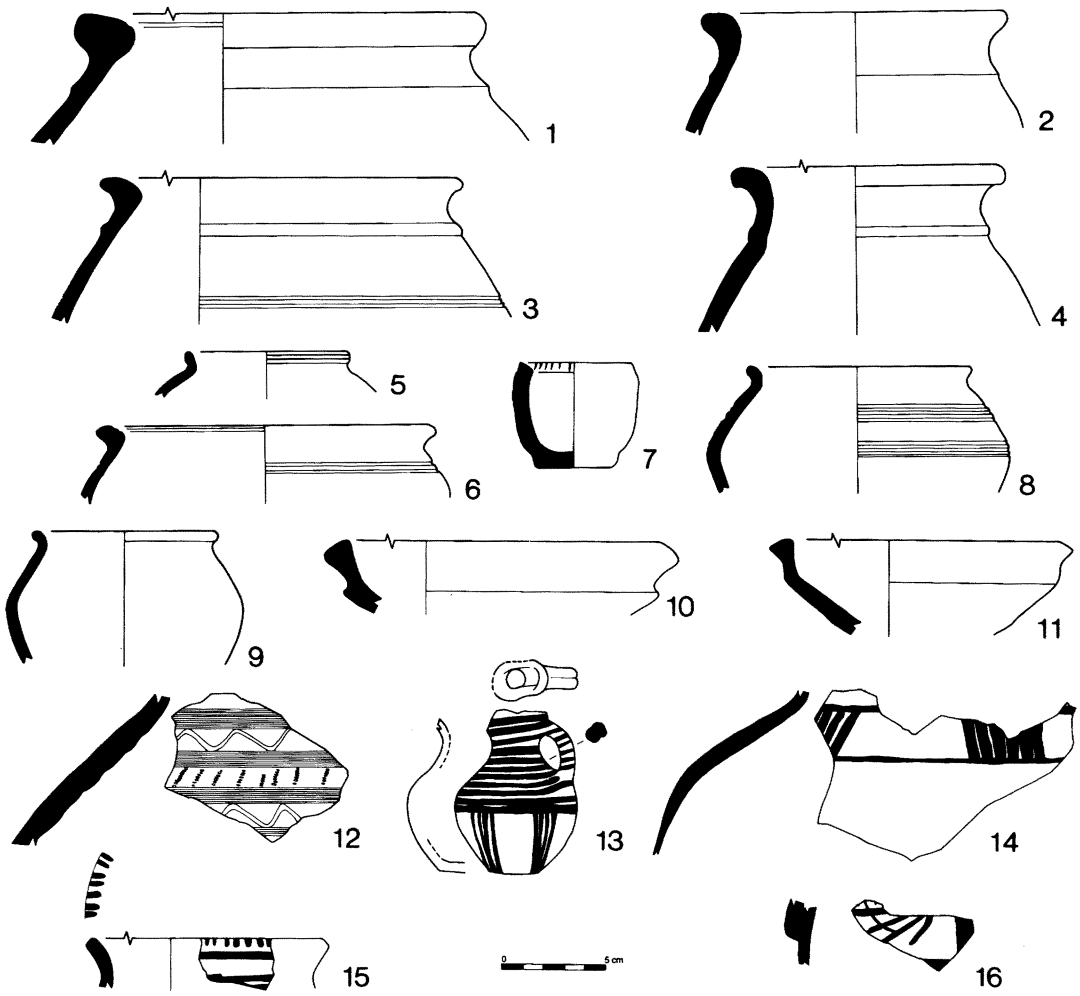

Fig. 8. MB I (Umm el-Marra IIId) pottery, from Acropolis West unit 1228/3860: *1*, light yellow slip exterior, light brown and pink core/interior, fine/medium sand and lime, wheelmade; *2*, yellow-brown slip exterior, core/interior light brown, fine white sand and lime, wheelmade; *3*, light gray, no visible temper, wheelmade; *4*, light pink exterior/interior, gray core, fine/medium chaff; *5*, light brown-yellow, fine/medium white sand and chaff, exterior rough surface; *6*, light yellow slip exterior, pink core/interior, fine white sand, wheelmade; *7*, light brown to gray, gray core, fine sand, crude handmade, incised notches at rim; *8*, white/yellow exterior/interior slip, core yellow-brown, fine sand, wheelmade, comb-incised; *9*, light yellow, no visible temper, wheelmade; *10*, light yellow/green, fine sand and chaff, wheelmade; *11*, light yellow exterior slip, core/interior red and brown, fine/medium white sand, wheelmade; *12*, light yellow, fine sand, wheelmade, comb-incised with punctate incision (7–8 marks each); *13*, light pink-brown, fine dark sand, brown paint; *14*, pink-brown, fine lime, some chaff, wheelmade, brown paint; *15*, brown-yellow exterior slip, core/interior brown, fine white sand, wheelmade, dark brown paint; *16*, light pink exterior/interior, core pink/brown/pink "sandwich," fine white sand, red paint (two-segment strap handle).

The kiln itself was a double-chamber updraft construction. The firing chamber was a domed rectangular structure built of mudbricks and mud (1.1 m extant height), whose 0.5 m thick mudbrick floor was perforated with holes to conduct the heat from below (fig. 11). A coating of yellow and green vitrified layers was apparent on the inner faces of the superstructure and in the holes in the floor, and segments of vitrified clay were also found in the fill of the structure. Underneath the firing chamber was the firebox, a subterranean mudbrick structure dug into preexisting tell deposits. Narrower than the firing chamber and 1.5 m high (fig. 12), the firebox had a circular stokehole located in the narrowing, eastern end of the structure. The inner faces of the firebox walls were vitrified with a yellow and green coating; ceramic slag, later third-millennium (EB IV) pottery wasters, and a small gray spiral-burnished goblet were found inside. Pottery kilns in a diversity of shapes are abundantly attested from mid–late third millennium Syro-

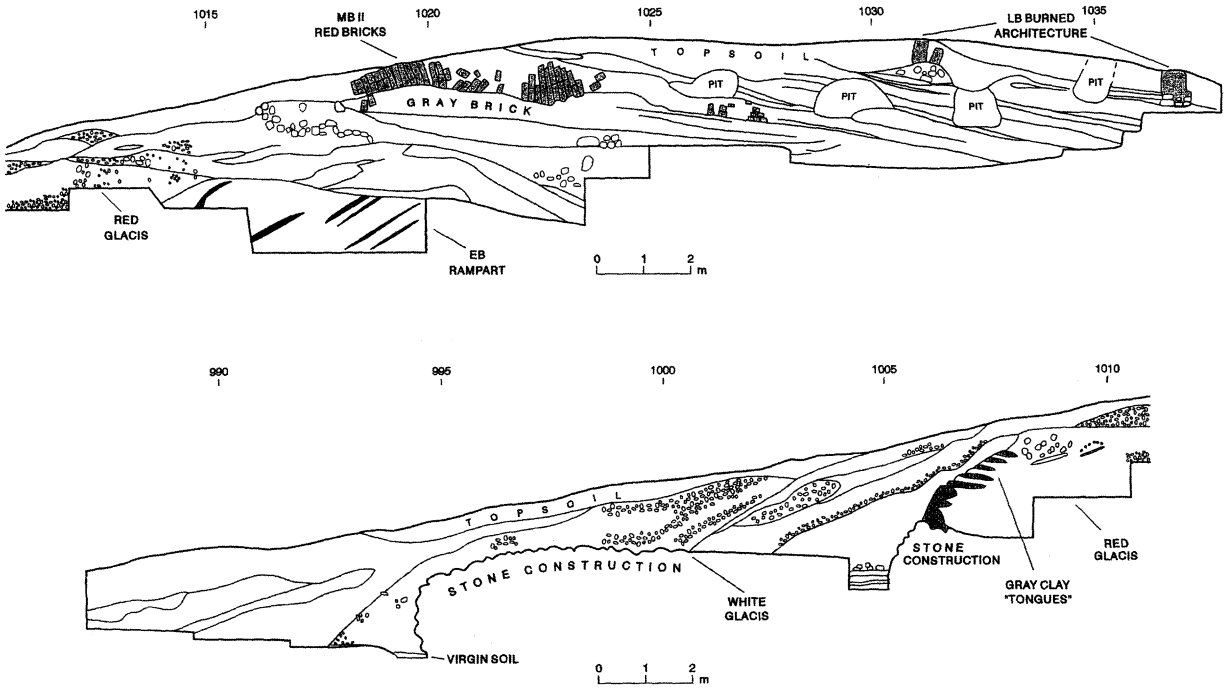

Fig. 9. North section, city wall trench, West Area A; eastern (upper) segment depicted above western (lower) segment. Note pebbly additions to red and white glacis constructions.

Mesopotamia,[29] demonstrating the association of intensified and specialized pottery production with the development of local urban societies. The proliferation of specialized, more elaborate kilns may also signal an effort to increase fuel efficiency in the face of increased demand and a diminishing fuel supply resulting from deforestation (see "Plant Remains," below).[30]

Exploratory Excavations

Four previously unexplored areas of the tell were investigated to determine whether extant remains had functional or chronological characteristics that differed from those previously encountered.

Acropolis North. A sequence from MB II to the Hellenistic period was documented in the 8 × 10 m trench (1270/3936) opened west of the Belgian sounding SE in the Acropolis North Area. Below the fragmentary Hellenistic level (Umm el-Marra Ib) was LB domestic architecture (Umm el-Marra II). Much better preserved was the MB II phase beneath (Umm el-Marra IIIa–c), which included two rooms of a domestic character in the eastern part of the trench, with two storage jars, grinding stones, and other implements in situ in the northern room (fig. 13). Against the exterior wall of the southern room were two small adjacent circular clay ovens, one of which had a clay andiron standing at its edge whose exterior face was incised with a large "x" surmounted by a "u." In the northwest corner of the northern room was a large block of mudbricks facing a niched construction to the west and forming an apparent entryway, suggestive of larger-scale (public?) architecture.

Northeast Area. A northeast city gate had been identified by the Belgian excavations in area SF, with several phases dated tentatively to MB and EB.[31] In order to expand this area and clarify the chronology of fortification, excavations were conducted north of the gate in 1997. Stratified prior to a Hellenistic wall was a large-scale MB II construction oriented NW–SE consisting of one or

[29] Examples occur at numerous Euphrates sites, such as Habuba Kabira North, Tell el-ʿAbd, Halawa, and Lidar Höyük, as well as Chuera and Leilan (lower town) in the Syrian Jezireh (Strommenger 1980, 76–7; Bounni 1979, 50–2; Orthmann 1981, 61–2; 1989, 55–6). The shape of the Umm el-Marra kiln's firebox resembles that of Tell al-ʿAbd; a subterranean firebox smaller than the firing chamber above it as at Umm el-Marra is attested at Halawa, oven 1. Kilns are often located on site edges; although a location on the western limit of a site as at Umm el-Marra would seem to defeat the purpose of avoiding the kiln smoke, given northwesterly winds, the site ramparts to the east may have served as an effective buffer.

[30] Alizadeh 1985, 48.

[31] Tefnin 1983, 143.

Fig. 10. City wall trench, West Area A, showing stone revetments for white glacis (foreground) and red glacis (background). The view is toward the east.

more courses of bricks laid above a substructure of earthen fill divided at intervals by walls of single bricks.[32] This feature, at least 12 m wide, was perpendicular to a wall at least 2 m wide to the southwest. In the corner formed by these two structures was an earth and pebble "massif" containing EB sherds; it is not clear if the two perpendicular constructions cut the earth and pebble massif (a rampart or glacis?) or were erected adjacent to it in a contemporaneous context. A 2 m-wide exploratory trench cut through the 12 m-wide brick and earth construction revealed another earth and pebble massif below it containing EB sherds. While the chronology and complete plan of these constructions remain to be clarified, evidence of large-scale MB fortification associated with the northeast gate seems clear.

Southwest Area. Excavations in a 14 × 2 m trench exposed stone foundations of Hellenistic architecture near the present-day surface, including the burial of an adult interred in a brick cist. Below was LB domestic architecture, two phases of which were also exposed in small soundings to the east.

Southeast Area. Two Hellenistic and two LB phases were excavated in the southeast in an 8 × 10 m unit (1373/3760). In the later LB phase was a multiroom building of specialized character. Its northeastern room had four brick cubicles with a cruciform channel between them (fig. 14). The surface of the brick cubicles had been covered with pebbles that were in turn overlain by a relatively thin deposit of fine black ash. To the west, an adjacent room only partly excavated had a similar deposit of fine black ash in association with a circular clay oven. The southern room of the building had been badly disturbed by modern burial pits and did not yield any specialized features. An interpretation of the activities taking place in this building might involve baking bread with heated pebbles on a flat surface, a practice attested in Iran.[33]

Just outside this building against the stone substructure in the northeast corner, a small terra-cotta mold-made figurine of a seated god was found (fig. 15). The deity sports a long beard and wears a multihorned crown surmounted by a crescent enfolding a disk probably representing the sun and moon; his hands rest on his knees, and his garment includes two long straps across the shoulders. The crown is reminiscent of that worn by the figure of the "Jabbul head" now in the Louvre.[34] Although three-dimensional metal representations of enthroned males are well known in MB/LB Syria, and stone examples are attested (e.g., at Ras Shamra), clay specimens are rare.

Summary

The 1996–1997 excavations at Umm el-Marra have begun to provide evidence for the earlier periods of occupation at the site. The foundation of the community in the mid-third millennium is now apparent, and the data suggest that the site quickly attained the status of a large and fortified community. In the late third millennium, at the end of EB, some areas of the site were abandoned, while others survived in the minimally documented MB I period. MB II sees the community reoccupied on a large and prosperous scale, accompanied by the

[32] See again the early second-millennium mudbrick platform at al-Hiba, where empty spaces inside the mudbrick structure were filled with earth and capped with mudbrick (Hansen 1978, 77–8).

[33] Cf. Burney 1964, pl. XIVc. We are grateful to J. McHugh for this reference.

[34] Dussaud 1926, 341. The Umm el-Marra figure is probably a high-ranking god rather than a deified king, given his multitiered crown.

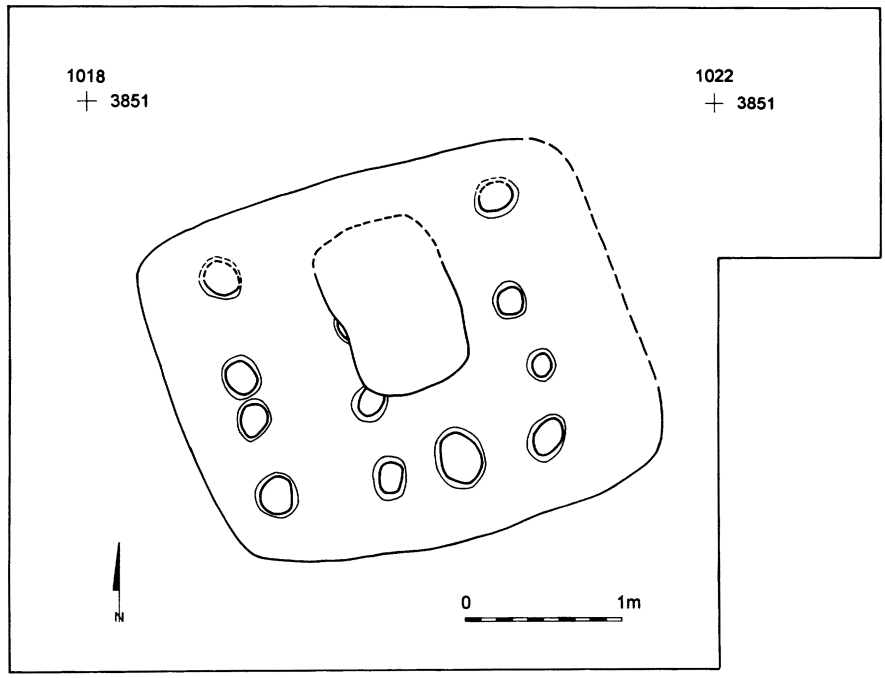

Fig. 11. Floor of firing chamber, EB kiln, city wall trench, West Area A

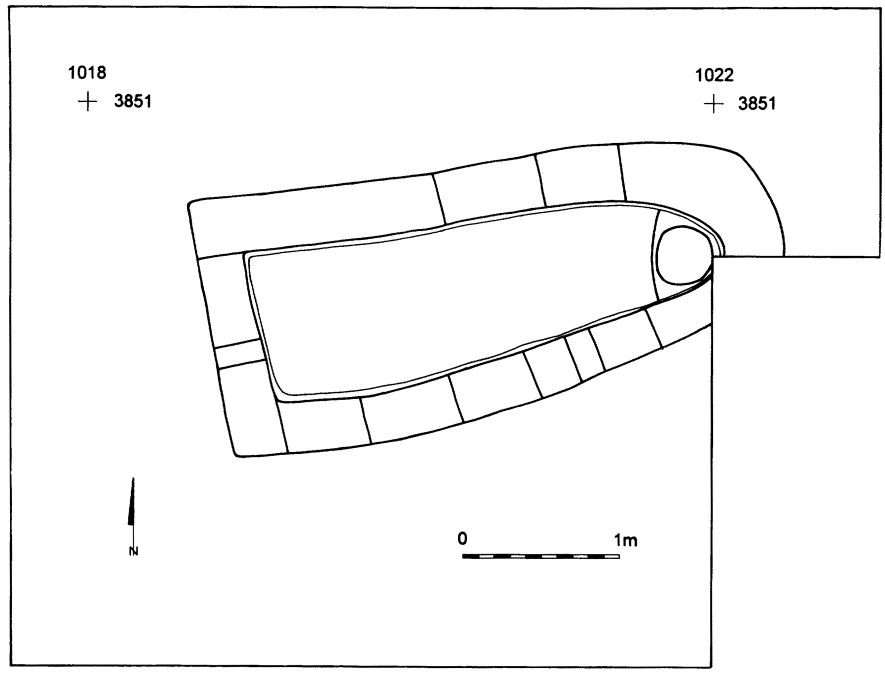

Fig. 12. Firebox, EB kiln, city wall trench, West Area A

construction of large-scale defensive architecture, while the character of the LB settlement is resolutely domestic, without significant evidence of large public institutions or building projects. Investigation of previously uninvestigated parts of the site revealed chronological sequences similar to those already excavated, with evidence of possible public architecture requiring further investigation.

ANIMAL EXPLOITATION

Prior to the Hopkins-Amsterdam project, only two sites in the plain of Jabbul (Abou Danné and Umm

Fig. 13. MB II (Umm el-Marra IIIa–c) architecture, Acropolis North, unit 1270/3936. The view is toward the southwest.

Fig. 14. LB (Umm el-Marra II) architecture with cubicles and cruciform channel, Southeast Area, unit 1373/3760. Cobbles and pebbles have been removed to expose bricks of two cubicles in northern room. Intrusive burials in north walls of northern and southern rooms. The view is toward the northeast.

Fig. 15. Seated terra-cotta figurine of god, from LB (Umm el-Marra II), Southeast Area unit 1373/3760 (UMM 97 H-15, 2 × 2 m square 1377/3760, 6 × 2 × 2 cm)

el-Marra) had been excavated. Since no faunal data have been published from these excavations, this preliminary study represents the first examination of animal exploitation in the Jabbul plain. The report is based on the bone fragments analyzed during the 1997 field season at Umm el-Marra, including material representing each of the Bronze Age periods of occupation.[35] The EB and MB sample derives from the Acropolis East and West; the majority of the LB material is from the large trash pit in West Area B. Field analysis consisted of phase 1 of M. Zeder's two phase system.[36]

The preliminary results of this analysis have raised many interesting questions about the economic focus of the ancient population at Umm el-Marra. Most strikingly, the data indicate that the inhabitants of this community heavily exploited resources found in an open steppe environment, a trend that increased steadily from EB to MB. The focus of this exploitation appears to have been the hunting of onagers, which reached a peak in MB II. In the LB period the faunal assemblage reflects a greater diversification in the subsistence economy, with a shift away from the hunting of onager and a greater reliance on cattle. Throughout the sequence, the ancient inhabitants do not seem to have been particularly choosy about their diet: all sources of protein, including dog, appear to have been consumed.

Bronze Age Animal Exploitation

Sheep, goat, equid, cattle, gazelle, pig, and dog (see following discussion) comprise the major food animals in all periods of occupation (table 2). Other mammals, such as hare, tortoise, fox, and deer, are only minor components of the faunal assemblage. Few birds were found, but those identified include ostrich, goose, bustard, and pigeon or dove.[37] The single ostrich first phalanx (from an MB II deposit) adds Umm el-Marra to a growing list of MB sites from which bones, rather than eggshell, of this animal have been found.[38]

A comparison of the different periods within the Bronze Age shows gradual change over time in the relative abundance of different species. Sheep and goat are nearly always the most numerous animals relative to the other major species. Their contribution to the total assemblage decreases over time, however, from ca. 65% in EB to 50% in LB. Equids are always the next most common animal. Unlike

[35] Approximately 26,000 bones were analyzed in the 1997 season, but only the bones clearly belonging to EB, MB, and LB contexts are discussed here.

[36] Zeder 1990, 24–30. Phase 1 entails taxonomic identification, counting and weighing of all fragments, and taking measurements when possible. Identifications were facilitated by an extensive modern comparative collection and reference literature. Comparative material was generously supplied by Curvers, who transported the collection from Beirut to Umm el-Marra, from a collection created and maintained at the Beirut Archaeological Centre. Phase 2 (not yet begun) involves identifying such variables as age and sex as well as bone modifications such as butchery and burning.

[37] A very small sample (6 samples) of bird bone was brought back from Syria. These were identified (very generally) using the bird collection of the vertebrate zoology department at the Natural History Museum, Smithsonian Institution. Thanks are due to P. Angle, who made the collection available for my use.

[38] For Tell Halawa, see Boessneck and von den Driesch 1989, 113–51. For Tell Habuba Kabira, see von den Driesch 1993, 52–9.

Table 2. Number of Individual Specimens (NISP) of Animals by Period

Type of Animal	EB	MB I	Early MB II	Later MB II	MB II*	LB
Sheep/goat	158	98	151	185	142	267
Sheep	15	5	11	16	12	23
Goat	10	9	13	18	16	17
Gazelle	8	2	20	24	19	52
Sheep/goat/gazelle	19	16	17	38	35	64
Pig	9	5	8	4	4	20
Cattle	35	17	27	30	12	68
Deer	1	0	2	0	0	2
Bovid/cervid	1	2	5	1	0	6
Equid	39	54	119	148	95	168
Dog	4	5	23	19	14	5
Fox	0	0	0	1	1	0
Hare	1	0	0	1	1	0
Bird	2	3	3	2	2	9
Reptile	0	0	3	1	0	0
Large mammal	278	132	209	316	194	1019
Medium mammal	606	209	436	761	500	95
Small mammal	3	0	1	8	8	0
Unidentified mammal	81	7	25	65	31	144

*Refers to all MBII bones from the Acropolis East and to those from the Acropolis West that could not be designated "early" or "late" MBII.

sheep and goat, the proportion of equids generally increases from EB through MB, before decreasing slightly in LB. Equids are far more significant relative to sheep and goat when quantified by weight (as opposed to counts of NISP, that is, number of individual specimens). The greater weight of the equids is a reflection of the larger size of those animals, and a greater amount of meat per animal, than the smaller sheep and goat. It also reflects the deposition of large portions of individual equids (several elements of a single animal) in the same place, and thus possibly differential processing. Among the equids, onager, donkey, and, in MB and LB, horse are all present, but onager is the most numerous (see below).

Cattle, pig, gazelle, and dog are the other major animals found. Although these species are present throughout the Bronze Age occupation, the proportion of pig and cattle steadily decreases over time, while the proportion of gazelle and dog increases. Of the wild animals, onager, gazelle, hare, fox, tortoise, and ostrich are all to be found in the steppe. The goose and bustard are animals of the field and grass, while the deer is the only animal that is to be found in a wooded environment.

Clearly, the steppe was an important environment around Umm el-Marra, and it was exploited almost to the exclusion of any other. Deer is very rarely found and is mainly represented by antler fragments. Every other animal would have been either hunted or husbanded on either the steppe or on the agricultural fields surrounding Umm el-Marra. In fact, if it can be assumed that large herds of sheep and goat were herded in the steppe, then approximately 85% (in EB) to 95% (in later MB II) of animals in our sample were either hunted or husbanded in the steppe. This pattern is corroborated by the botanical data, which show that wood fuel may have been scarce (see "Plant Remains," following) and indicates a steppic environment in the site vicinity.

The complete lack of any lacustrine species is surprising, given the proximity of Umm el-Marra to the saline Jabbul Lake. Salt is of considerable importance for consumption and as an ingredient in leather tanning, which may have been an important industry at Umm el-Marra, as faunal data indicate (see "An MB Steppe Economy," following). Two possible implications are (1) the absence of the lake in the Bronze Age, or (2) inaccessibility to the resource. The latter could be a result of social or political boundaries or a lack of the labor, technology, or knowledge to exploit the lacustrine environment and mine the salt.

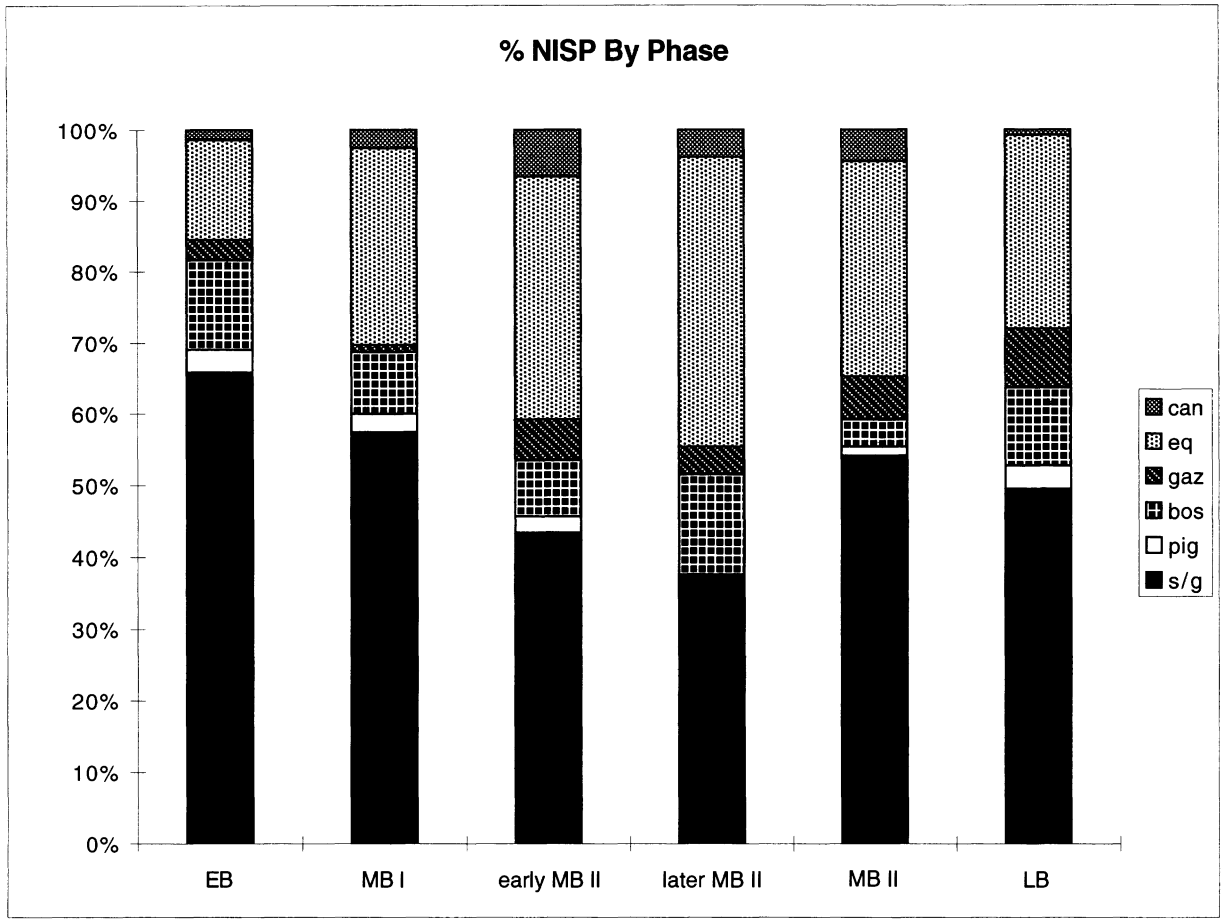

Fig. 16. NISP comparison

An MB Steppe Economy: Specialized Onager Hunting

The steppe became even more heavily exploited over time, a trend beginning in MB I but becoming much more pronounced in early MB II. Equids and gazelle increase in relative abundance to all domestic species except dog, which also increases (fig. 16). In later MB II on the Acropolis West, sheep and goat comprise less than 40% of the assemblage. Further, sheep and goat show a slight shift in ratio with respect to one another, likewise indicative of increased exploitation of the steppe. Although the ratio of sheep to goat closely approximates 1:1 in all periods, sheep slightly outnumber goat in EB, goat outnumber sheep in MB, and the pattern reverses again in LB. Because goats are generally more suited to aridity than sheep, the overall pattern of change during MB is toward animals that are better suited to a drier environment. Interestingly, N.F. Miller ("Plant Remains," following) suggests that the area around Umm el-Marra was more steppic in the MB than in the EB. It is difficult to determine, however, whether the increased exploitation of the steppe was a result of climatic or cultural changes. The paucity of sites to the east of Umm el-Marra in MB revealed by the regional survey data (see "A Survey on the Jabbul Plain," following) might have opened the steppe to the Umm el-Marra inhabitants by removing social boundaries.

Why did the steppe become more important in MB? One might suggest that climatic or environmental degradation expanded the steppe boundaries, or that an opportunity arose to exploit valuable steppe resources. Interpretation of this shift in focus rests in part on the species identification of the equid remains, because the proportion of equids in the assemblage is so high. A large number of donkeys may suggest the importance of long-distance trade, while a large number of onager may suggest the importance of onager meat and hides.

Species distinctions of bones of the genus *Equus* are difficult to make because of extreme morphological similarity and overlap of absolute size of individual bones between species. The proportions of certain elements, however, differ between donkey and onager. It has been observed that the medial tubercle just proximal to the distal articulation of

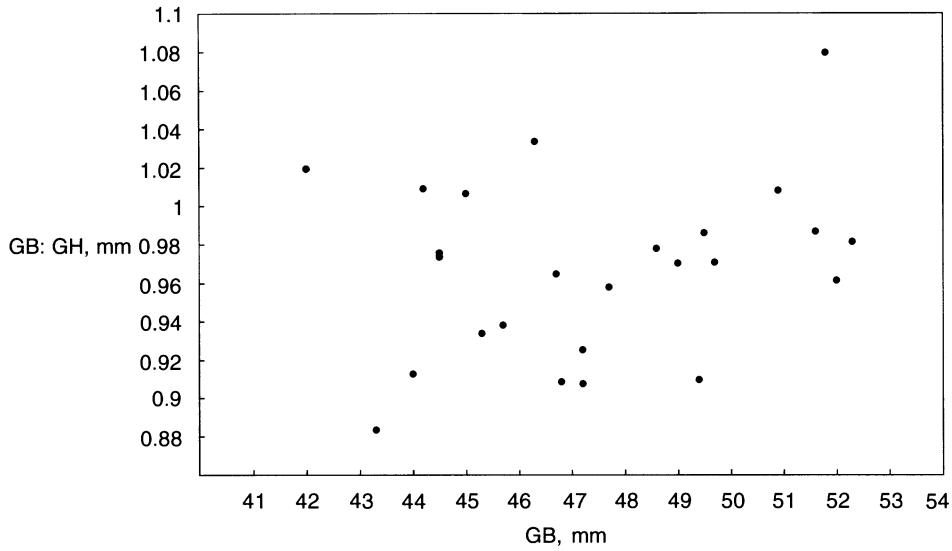

Fig. 17. Plot of equid astragali from Umm el-Marra: *Y*-axis = greatest breadth (GB)/greatest height (GH); *X*-axis = GB

the astragalus protrudes farther in donkey than in onager, giving the donkey the appearance of greater breadth to depth in the caudal view.[39] That distinction was thought to be manifest metrically by a greater ratio of the breadth of the facies articularis (Bfa) to the depth of the facies articularis (Dfa) in donkey;[40] however, this ratio does not appear to distinguish reliably between the two species. Instead, the distinction has been preliminarily found to be expressed as an index of the ratio of greatest breadth (GB) to greatest height (GH), plotted against the GB.[41] A series of 24 astragali from Umm el-Marra were plotted according to this index.

The plotted data (fig. 17) fall into two distinct categories, with a single outlier at the very top of the plot, and an indeterminable bone located midway between the two groups. Comparing astragali from known onager and known donkey (not included here), we can conclude that the group with the higher y-axis value and lower x-axis value are donkeys. This correlates to the known interspecific morphological distinction based on the medial tubercle. The group with the lower y-axis value and higher x-axis value are onagers. In the scatter plot for the Umm el-Marra equid astragali, only two bones fall between the two groups. It is not clear to which species these belong. The bones are too small to have come from a horse, but the possibility that they come from an equid hybrid cannot be ruled out.[42]

Of the 24 astragali plotted, 18 are identified as onager and 4 as donkey. If the distribution of the astragali is representative of the assemblage as a whole, then ca. 75% of the equid bones come from onager.[43] Further evidence supporting the identification of these animals as onager rather than donkey is provided by the absence of bones from infants and the rarity of bones from juvenile animals. Younger animals would be expected, if many donkeys were being raised at the site. Thus it seems that hunting became more important in MB than it was in EB. This conclusion is also supported by the increase of gazelle over the same time period.

It is also noteworthy that dog increases throughout the MB along with the wild animals. The covariance between wild species and dogs may indicate that dogs were used to hunt the animals. Indeed, dogs are shown on third-millennium seals in what are interpreted as hunting scenes,[44] and they are clearly depicted hunting onager on late Assyrian palace reliefs. Gazelle and onager sometimes form

[39] Meadow 1986, 266–301; Uerpmann 1986, 246–65; 1991, 12–33.

[40] Meadow 1986, 266–301.

[41] Weber (forthcoming). Equid measurements are after Eisenmann 1986, 67–116.

[42] Onager x donkey hybrids are known to have existed in northern Syria from mid-third-millennium documents from both Ebla and Tell Beydar (Archi 1998, 1–16; Van Lerberghe 1996, 107–18). These particular "odd" bones derive from early MB II levels and therefore could be the hybrid of a horse and another equid.

[43] It is not certain that the other elements will follow the same pattern. Differential butchering may result in a variable distribution of body parts for onager and donkey.

[44] Jans et al. 1998, 155–94.

herds together in the steppe and may have been obtained in the same excursions.[45] Onager and gazelle may have been hunted for their hides and other products, such as sinew, bones, and (gazelle) horn cores for use as tools. Hides were economically important commodities, and a focus on their production would probably be highly profitable. Both gazelle and equid bones have been found at Umm el-Marra that were fashioned into implements. In addition, a large number of awls were recovered at Umm el-Marra by the Belgian team from MB deposits.[46] It has been suggested that polish on the awl points was obtained by piercing leather. The timing of these awl finds correlates to the increased exploitation of equid and gazelle. Eventually, butchery evidence from the bones themselves may help to determine whether the hides were utilized. Flaying often leaves characteristic cut marks on bones such as the mandible or on the distal portions of limbs. Extremities of equids were found together in the recent excavations, notably the phalanges, metapodials, and carpals and tarsals. These bones are often removed as a "package" with an animal hide, and their disposal together may indicate skinning.

This evidence, while only suggestive at present, makes the absence of evidence for exploitation of salt marsh resources all the more surprising, since salt was a major ingredient in tanning. Data culled from the mid-third millennium administrative archives of Tell Beydar, however, indicate a high degree of specialization and segregation of production or acquisition of basic commodities such as salt, pig's fat, barley, and wine, which may have been the case in MB as well. Thus the inhabitants of Umm el-Marra may have specialized in producing animal hides, but some other entity may have specialized in producing the salt that was essential to the endeavor. Conversely, the acquisition of hides may have been an industry independent of tanning.

Whether or not the acquisition of hides was of prime importance, our evidence points to direct exploitation of the steppe for its economically valuable resources. The steppe had been extensively utilized in EB, when the site was founded, and this practice simply intensified in MB. If increased steppe exploitation was the result of climatic deterioration in MB, then cattle should have exhibited a greater decline, and sheep and goat—which are relatively well suited to grazing on the steppe—should not have decreased as much.

Late Bronze Diversification

In LB another shift in exploitation occurs. Cattle increase in significance, and sheep once again outnumber goat. The large percentage of gazelle (ca. 8%) indicates that the steppe was still exploited. Horse and donkey are relatively more abundant among the equid remains, and onager exploited less intensively, while dog almost disappears from the LB assemblage. The correlation with a decrease in onager and dog but not gazelle may indicate that gazelle were not hunted with the aid of dogs but with a different technology than were the onager. Overall, there is a greater evenness in exploitation, with several species exploited in relatively large numbers.

The majority of the LB sample studied in 1997 derived from a large trash pit in West Area B rather than from the Acropolis, where the EB and MB samples originated. This does not seem to be the cause of the changes in relative abundance of animals, however, since a small sample examined from the Acropolis West—where the majority of the equid and canid remains were found in the earlier periods—did not have a single equid or canid bone. Instead, sheep, goat, and gazelle constitute the majority of the finds in that area.

The LB reduction in steppe exploitation may have been the result of a contracted steppe boundary, perhaps because of an effort to cultivate more of the land surrounding the site, made possible by an amelioration of climatic conditions. By the same token, onager herds may have been reduced, or their products may have become less valuable. The latter might be expected if regional economies were more generalized and locally focused during the LB, thus producing less for exchange.[47]

Dog as Food

All of the animal species found at Umm el-Marra appear to have been used as food, including dogs and donkeys. Bones of the latter two species occur in the same contexts as other food waste and occur in the same condition. Specifically, many of the dog bones had been broken, butchered, and burned like the other, more traditional, food animals. In fact, 7.1% of the measured bones of dog had been burned;[48] only the proportion of burnt equid bones (11.5%) was higher. While it is difficult to say what proportion of the burned equid material represents donkey, at least two donkey bones were found burned. Most of

[45] Groves and Willoughby 1981, 321–54.
[46] Doyen 1986, 30–74.
[47] Bates and Lees 1977, 824–41.
[48] In phase 1 analysis, burning is only noted on bones that are measured.

the other species showed burning on ca. 3% of their bones, with only pig bones having no signs of burning. While cut marks are not usually noted in phase 1 analysis, their incidence on a large number of dog bones was observed, particularly on bones of the skull, neck, and pelvis, indicating butchery. Broken, cut, and burned bones were typical of all animals, suggesting that dogs and donkeys were accorded the same treatment as "regular" food animals such as sheep, goat, cattle, gazelle, and onager. These bone modifications largely resemble the remains of kitchen waste. Individuals of every species were found in all states of deposition, however. Some had been thrown whole into the trash, while others had undergone processing consistent with utilization of various products, including hides and meat.

It is clear that the predepositional condition of the dog and donkey bones was the same as that of the "typical" food animals. The only nonconsumptive explanation for similar treatment of all animal bones would hold that they were cut up and burnt in preparation for disposal. However, chopping up the bones, in addition to burning them, would seem to be an excessive sanitary precaution, although not implausible. Alternatively, if the bones were used as fuel, then fragmentation may have afforded some benefit. The utilization of bone as a fuel is certainly a possibility, given the lack of wood fuel around the site (see "Plant Remains," following). The most parsimonious explanation at present, however, is that the dogs and donkeys were eaten, along with the other animals.

Of course, the fact that dogs and donkeys were eaten does not necessarily mean that humans were doing the eating, or that the animals were eaten as a standard meal. Ur III period documentary sources specifically mention donkeys as food for dogs, and meat, bones, urine, and feces of dog were used for medicinal and magical purposes.[49] Finally, human reaction to environmental stress is varied but often results in atypical behaviors such as eating foods outside the "normal" category.[50] It is equally likely, however, that dog was simply an accepted, though infrequent, food source. Butchered bones of dog have been found at Neolithic Sabi Abyad, where they are also interpreted as food remains.[51]

Animals and Environment in the Jabbul Plain

For the first time, we have a picture of Bronze Age subsistence practices in this area occupying a strategic position between the urban hubs of, successively, Ebla and the state of Yamhad, the northwestern stretch of the Syrian "desert," and the Euphrates valley. The desert-steppe was a clear focus of animal procurement strategies. Large numbers of gazelle and onager were hunted, and sizeable herds of sheep and goat were readily available. At the same time, the inhabitants of Umm el-Marra obtained meat from every available source, including animals not typically thought of as food animals, such as dogs and donkeys.

Ultimately, increased resolution of the archaeological record may be necessary to explain this picture of shifting exploitation patterns. Seasonal cycles in the availability of specific resources may vastly affect patterns of exploitation. Also, social and functional differences within a site may result in unique patterns of animal deposition between site areas. Further research in the Jabbul plain will help to explain whether the patterns noted here are local phenomena or part of a greater regional design.

PLANT REMAINS

Umm el-Marra is located in the Syrian steppe zone at about the 300 mm annual precipitation isohyet in a region suitable for dry farming.[52] In the past decade or so, massive irrigation works have dramatically changed the landscape, and so it is not easy to imagine the vegetation that would occur under traditional agriculture and pastoralism. Scrub vegetation around the site is affected and even maintained by human and animal activity, while the hills on the western edge of the plain are covered with trees characteristic of Mediterranean forest (oak, pine, and others).[53]

Twenty-five flotation samples from Umm el-Marra were analyzed for this report. Of these, four derive from EB deposits, nine from MB fills, seven from LB fills, and five from LB burned architecture excavated in West Area A (table 3). Ordinarily, if one has enough samples, one can get an overview of "cultural fill"; if burned stored crop remains are found in a sufficient number of deposits, differences with the cultural fill remains can further inform interpretations. Plant remains from MB or LB sites have not been investigated on a large scale, but several reports on small groups of samples are available. These include results from Hadidi in the

[49] Mander 1994. The Chicago Assyrian Dictionary notes several "uses" for different parts of dog.

[50] Forbes 1989, 87–97.

[51] Cavallo 1996, 475–520.

[52] van Zeist and Bottema 1991, fig. 3.

[53] Zohary 1973.

Table 3. Archaeobotanical Samples from Umm el-Marra

Sample Number	Date	Area	Year	Context*
1030/3996-012	LB	Northwest	1994	Terrace
1032/3852-002	LB	West Area A	1995	Burned area west of house 3
1038/3860-south room-002	LB	West Area A	1995	Burned house 3, room 2, next to vessel in northeast corner
1038/3860-north room-002	LB	West Area A	1995	Burned house 3, room 1
1044/3852-002	LB	West Area A	1995	Burned house 3, room 3
1044/4000-006	LB	Northwest	1994	Domestic room fill
1068/3854-004	LB	West Area A	1995	Burned room east of house 3
1148/3878-004	LB	West Area B	1994	Large trash pit
1148/3880-008	LB	West Area B	1994	Large trash pit
1228/3870-006	MB II	Acropolis West	1995	Small room, trench 1228/3872
1228/3872-room 1-002	MB II	Acropolis West	1995	Large room, trench 1228/3872
1234/3852-104	MB I	Acropolis West	1997	Ashy deposit outside house
1236/3860-008	MB II	Acropolis West	1995	Circular structure, room 4, ashy deposit
1242/3854-006	LB	Acropolis West	1994	Ashy pit, open area 31
1242/3854-100	MB II	Acropolis West	1997	Ashy deposit, open area 10
1244/3856-102	MB I	Acropolis West	1997	Ashy deposit outside house
1270/3928-007	LB	Acropolis North	1997	Ashy deposit, open area
1270/3930-009	MB II	Acropolis North	1997	Ashy deposit, open area
1314/3870-104	EB	Acropolis East	1997	Open area between northern and southern houses, phase b
1314/3870-110	EB	Acropolis East	1997	Open area between northern and southern houses, phase b
1314/3876-104	EB	Acropolis East	1997	Ashy room fill, northern house, phase b
1316/3880-008	MB II	Acropolis East	1995	Oven, room 6 (earliest MB II phase)
1318/3878-110	EB	Acropolis East	1997	Ashy room fill, northern house, phase b
1320/3866-010	MB II	Acropolis East	1995	Ashy pit (middle MB II phase)
1373/3758-006	LB	Southeast	1997	Ashy deposit; bakery?

*Numerical house and room designations refer to published plans in Curvers and Schwartz 1997.

middle Euphrates valley, where W. van Zeist has examined crop concentrations and some cultural fill deposits, and Hammam et-Turkman in the Syrian Jezireh with cultural fill remains.[54] EB sites such as Tell es-Sweyhat[55] and Selenkahiye[56] are better-known archaeobotanically, but the number of Umm el-Marra samples from EB contexts is small. Hadidi, Hammam et-Turkman, Sweyhat, and Selenkahiye all lie in the Syrian steppe zone on or near the Euphrates. Unlike Umm el-Marra, none is close to the Mediterranean forest zone.

Cultigens and Other Economic Plants

The two main cereal types encountered in the samples are two-row barley (*Hordeum vulgare* var. *distichum*) and bread wheat or durum (*Triticum aestivum/durum*). Barley outweighs wheat (4.43 g:0.58 g) and occurs in more samples (20:17). It constitutes about 95% of the identified cereal from the EB, and about 85% from the MB and LB periods. Barley also predominates in the cultural fill samples at the other steppe sites in the rainfall agriculture zone, presumably because barley is more drought tolerant than wheat.[57] Cereals are frequently recognizable in fragmentary form, so weight rather than count is reported on tables 4 and 5.

Rachis fragments of both bread wheat or durum and barley also occur at Umm el-Marra, along with those of emmer *(Triticum dicoccum)* or einkorn *(T. monococcum)*. Note that rachis fragments are likely to represent either crop-processing debris or remains of animal fodder. We can now say that in EB and MB samples, barley rachis fragments vastly outnumber those of wheat. The situation is somewhat reversed in the LB samples, with wheat rachis fragments outnumbering those of barley. Other non-

[54] van Zeis and Bakker-Heeres 1985, 247–316; van Zeist et al. 1988, 705–15.

[55] Miller 1997b, 95–122; van Zeist and Bakker-Heeres 1985.

[56] van Zeist and Bakker-Heeres 1985.

[57] Miller 1997a, fig. 7.6.

Table 4. Seeds and Plant Parts from Umm el-Marra Flotation Samples, EB and MB

Provenience square	1314/ 3870	1314/ 3870	1314/ 3876	1318/ 3878	1228/ 3870	1228/ 3872	1234/ 3852	1236/ 3860	1242/ 3854	1244/ 3856	1270/ 3930	1316/ 3880	1320/ 3866
Lot	104	110	104	110	6	Room 1-002	104	8	100	102	9	8	10
Year/sample no.	97.11	97.13	97.09	97.02	95	95	97.01	95	97.05	97.07	97.12	95	95
Period	EB	EB	EB	EB	MBII	MBII	MBI	MBII	MBII	MBI	MBII	MBII	MBII
Volume (l)	15*	15*	15*	15*	10	10	15*	10	15*	13*	15*	10	10
Charcoal > 2mm (g)	0.35	0.68	1.37	0.33	0.39	0.05	0.30	0.49	0	0.09	0.40	0.03	0.09
Seed > 2mm (g)	0.22	0.73	0.43	0.42	0.97	0.05	0.31	0.30	0.22	0.16	0.77	0.15	1.08
Rachis, culm, etc. > 2mm (g)	0.02	0.09	0.03	0.08	–	–	0.01	0.02	0.02	0.01	0.03	0.01	0.21
Charred density (g/l)	0.04	0.10	0.12	0.06	0.14	0.01	0.04	0.08	0.02	0.02	0.08	0.02	0.14
Seed/charcoal (g/g)	0.63	1.07	0.31	1.27	2.49	1.00	1.03	0.61	n/c	1.78	1.93	5.00	12.00
Wild seed (#)	600	1481	846	348	118	32	104	106	151	243	684	81	103
Wild/charcoal (#/g)	1714	2178	618	1055	303	640	347	216	n/c	2700	1710	2700	1144
Wild/cereal (#/g)	1714	1742	1627	590	738	800	335	286	503	1279	561	352	89
Food and cultigen seeds													
Hordeum (g)	0.16	0.52	0.30	0.33	0.16	0.03	0.14	0.21	0.16	0.10	0.64	0.16	0.46
Triticum aestivum/ durum (g)	–	–	–	–	–	–	–	–	0.01	0.01	0.05	0.01	0.15
Triticum sp. (g)	0.01	0.03	0.01	0.02	+	–	0.02	–	–	–	–	–	0.11
Cereal indet. (g)	0.18	0.30	0.21	0.24	–	0.01	0.15	0.16	0.13	0.08	0.53	0.06	0.44
Cicer	–	–	–	–	–	–	–	–	–	1	–	–	–
Lathyrus	–	–	–	–	–	–	2	–	–	–	–	–	–
Lens	–	1	–	1	1	–	–	1	–	–	2	–	–
Pulse indet.	–	–	–	–	–	–	–	–	1	–	–	–	–
Ficus	4	13	–	–	1	–	–	–	–	–	–	–	1
Olea	–	–	–	–	4	–	–	–	–	–	–	–	–
Vitis	–	1	–	–	–	1	–	1	–	–	–	–	2
Coriandrum sativum	–	–	–	–	–	–	–	2	–	–	–	–	–
Carthamus cf. *tinctoria*	1	7	2	–	–	–	2	–	–	–	–	–	1
Wild and weedy seeds													
Aizoon	–	1	–	–	1	–	–	–	–	–	–	–	–
Ammi	–	–	–	–	–	–	1	–	–	3	2	–	–
Apiaceae indet.	–	2	–	–	–	–	–	–	–	–	–	2	–
Artemisia	1	7	–	–	–	–	–	–	2	–	–	–	–
Centaurea	3	16	146	33	1	–	–	4	–	–	–	–	14
Asteraceae indet.	6	13	2	9	–	–	2	2	3	4	4	1	–
Heliotropium	–	–	3	–	–	–	–	–	–	–	–	–	–
Neslia	–	–	–	–	–	–	–	–	–	–	–	–	1
Brassicaceae indet.	1	2	–	2	–	–	–	–	–	–	2	–	–
Gypsophila	2	2	5	37	1	–	–	2	2	–	–	–	–
Silene	4	19	6	3	5	–	–	–	–	–	–	–	–
cf. *Stellaria*	1	5	–	8	–	1	–	–	2	3	2	2	–
Vaccaria	–	–	–	–	–	–	–	–	–	–	1	–	–
Caryophyllaceae indet.	5	–	8	16	–	–	–	4	–	–	–	–	–
cf. *Chara*	2	8	1	–	–	1	–	–	–	–	–	–	–
Atriplex	–	–	1	–	–	–	–	–	–	–	–	–	–
Chenopodium	4	–	–	–	2	–	–	1	–	–	–	–	–
Salsola	–	–	–	–	–	–	–	2	–	–	1	–	–

Table 4 *(Continued)*

Provenience square	1314/ 3870	1314/ 3870	1314/ 3876	1318/ 3878	1228/ 3870	1228/ 3872	1234/ 3852	1236/ 3860	1242/ 3854	1244/ 3856	1270/ 3930	1316/ 3880	1320/ 3866
Lot	104	110	104	110	6	Room 1-002	104	8	100	102	9	8	10
Year/sample no.	97.11	97.13	97.09	97.02	95	95	97.01	95	97.05	97.07	97.12	95	95
Period	EB	EB	EB	EB	MBII	MBII	MBI	MBII	MBII	MBI	MBII	MBII	MBII
Suaeda	1	3	2	–	8	–	6	–	4	6	105	1	–
Chenopodiaceae indet.	6	3	–	2	–	–	–	–	–	–	–	–	–
Cyperaceae indet.	1	2	4	1	–	–	–	–	–	–	–	–	–
Euphorbia	–	–	1	–	–	–	1	–	1	–	–	–	–
Astragalus	26	101	2	8	2	–	10	15	2	14	12	4	–
Coronilla	–	8	–	–	–	–	1	–	–	–	–	–	–
Medicago	3	5	–	–	–	–	–	–	–	–	–	–	–
Prosopis	–	3	2	–	–	–	–	2	–	–	–	–	–
Trifolium/Melilotus	11	65	13	3	–	1	2	–	–	2	–	1	1
Trigonella	59	225	15	9	17	3	5	9	20	13	4	1	–
Trigonella cf. *astroites*	12	24	3	2	–	–	3	–	–	2	2	–	–
Trigonella radiata	–	–	–	–	–	–	–	1	–	–	–	–	–
Fabaceae indet.	59	215	7	9	5	1	4	1	9	6	3	–	–
cf. *Erodium*	–	–	–	–	–	–	5	–	–	4	–	–	–
Hypericum	1	–	–	–	–	–	–	7	–	1	1	1	–
Teucrium	2	–	1	1	–	–	1	–	1	1	–	–	–
Ziziphora	–	–	6	–	–	–	–	–	–	–	–	–	–
Lamiaceae indet.	–	2	–	12	–	–	–	–	1	–	–	–	–
Liliaceae indet.	8	9	61	–	–	–	–	1	2	–	1	–	–
Linum	–	–	–	–	–	–	–	–	–	–	1	–	–
Malvaceae indet.	–	–	1	–	–	–	–	–	–	–	4	–	–
Fumaria	–	–	–	–	–	–	–	–	–	–	–	–	1
Glaucium	5	9	5	–	–	–	–	–	–	–	–	–	–
Papaver/Roemeria	11	42	1	2	–	–	–	–	–	7	4	–	–
Aegilops	2	3	6	3	–	–	–	–	–	3	5	2	1
Bromus	–	1	3	–	–	–	–	–	–	–	–	–	–
Eremopyrum	48	76	137	47	24	5	22	21	33	39	95	8	33
Hordeum	1	4	4	–	1	–	–	–	–	–	3	–	–
Hordeum cf. *murinum*	–	5	1	2	–	1	–	–	1	1	3	–	–
Lolium	–	–	–	1	–	–	–	–	1	–	–	–	–
Lolium remotum-type	–	–	–	–	–	–	–	–	–	–	–	–	2
Phalaris	5	3	–	10	–	–	1	–	–	–	3	–	23
Phleum/Eragrostis	41	91	2	5	–	7	7	1	2	73	143	33	–
cf. *Trachynia*	–	1	1	–	–	–	–	–	2	–	–	–	–
Umm.Poaceae-2	48	140	10	–	3	–	1	–	9	4	41	–	–
Poaceae indet.	95	164	102	64	7	12	16	29	28	23	107	11	24
Rumex	–	3	–	–	–	–	–	–	–	–	–	–	–
Androsace	1	3	2	–	2	–	–	1	1	–	1	–	–
Adonis	1	1	4	6	–	–	1	–	2	–	2	–	–
Ceratocephalus	1	7	–	3	–	–	–	–	1	–	3	–	–
Sanguisorba	–	–	23	–	–	–	–	–	–	–	–	–	–
Crucianella	–	–	1	–	–	–	–	–	–	–	–	–	–
Galium	–	2	11	–	–	–	–	–	–	–	–	–	–
Scrophularia	2	1	240	–	–	–	1	–	–	1	–	–	–
cf. *Hyoscyamus*	–	6	–	2	–	–	–	–	–	–	–	–	–
Solanum	–	–	–	–	1	–	–	–	–	–	–	–	–
Thymelaea	–	–	1	–	–	–	–	–	1	–	–	–	–
Valerianella cf. *dentata*	–	1	–	–	–	–	1	–	–	–	3	–	–
V. vesicaria–type	–	1	1	–	–	–	–	1	1	–	–	–	–

Table 4 *(Continued)*

Provenience square	1314/ 3870	1314/ 3870	1314/ 3876	1318/ 3878	1228/ 3870	1228/ 3872	1234/ 3852	1236/ 3860	1242/ 3854	1244/ 3856	1270/ 3930	1316/ 3880	1320/ 3866
Lot	104	110	104	110	6	Room 1-002	104	8	100	102	9	8	10
Year/sample no.	97.11	97.13	97.09	97.02	95	95	97.01	95	97.05	97.07	97.12	95	95
Period	EB	EB	EB	EB	MBII	MBII	MBI	MBII	MBII	MBI	MBII	MBII	MBII
Peganum harmala	–	–	1	–	–	–	–	–	–	–	–	–	–
Unknown misc.	121	177	–	48	38	–	13	2	20	33	126	14	3
Plant Parts													
Hordeum int	15	81	35	6	2	–	5	10	1	–	76	4	27
Trititicum aestivum/durum int	–	–	–	–	1	–	–	1	–	–	–	–	24
T. monococcum/dicoccum sf	2	1	1	–	–	–	1	–	–	–	–	–	–
Triticum gb	–	1	–	–	–	–	–	–	–	–	–	–	16
Aegilops gb	1	6	6	1	–	–	–	2	–	–	1	–	–
Poaceae culm node	12	71	25	16	5	–	4	26	7	4	20	3	51
Poaceae rachis fragment	1	–	2	1	–	–	–	–	1	–	3	–	–
?Asteraceae capitulum	–	–	–	–	–	–	+	–	–	–	–	–	1
Atriplex fruit	–	1	8	–	–	–	1	–	–	–	–	–	–
Alhagi pod segment	–	1	–	–	–	–	–	–	–	–	–	–	–
Uncharred seeds													
Alkanna	–	1	–	–	–	–	–	–	–	–	–	–	–
Arnebia decumbens	3	14	44	44	23	18	14	40	32	–	–	2	115
A. linearifolia	–	–	–	–	–	–	1	–	1	–	–	–	–
Lithospermum tenuifolia	–	1	4	2	–	–	–	–	–	2	–	–	–
Moltkia	–	–	1	–	–	–	–	–	–	–	–	–	–
Boraginaceae indet.	–	–	–	–	–	–	–	–	–	–	–	–	–
Ficus (mineralized)	–	–	–	–	1	–	–	–	–	–	–	–	–
Chara (white)	–	1	–	–	–	–	–	–	–	2	–	–	–
Cyperaceae	–	–	–	–	–	–	–	–	–	–	–	–	1

*Indicates estimated volume. Abbreviations: gb = glume base; int = internode; n/c = not calculable; sf = spikelet fork

food cereal remains found in some samples are silicified awns. Two samples in particular had unusually high (at this point uncounted) amounts: an MB II ashy pit with dung ash (1320/3866-010) and an LB ashy pit (1242/3854-006).

A small amount of lentil *(Lens),* three grasspea *(Lathyrus),* and a single chickpea *(Cicer)* suggest pulse crops were available. Similar low proportions occur in Hammam et-Turkman cultural fill. Pulses commonly seem to be underrepresented in archaeobotanical assemblages of mixed fill, and it is difficult to assess their economic or dietary significance. At Hadidi, van Zeist inferred that pulses were significant crops there based on several concentrations of the seeds.[58]

Several fruits are represented in small quantities: fig *(Ficus),* olive *(Olea europaea),* and grape *(Vitis vinifera).* The fig could be wild, but the grape and olive are most probably from cultivated plants. Nowadays, an occasional olive tree can be seen on the road between Aleppo and Raqqa, but neither olive nor grape is well suited to the climate in the immediate vicinity of the site. The small number of such seeds may reflect the occasional deposit of fruit traded in from the west or north.

Two other economic plants have been recognized: coriander *(Coriandrum sativum)* and safflower (*Carthamus* cf. *tinctorius*). Coriander is a condiment whose

[58] van Zeist and Bakker-Heeres 1985.

Table 5. Seeds and Plant Parts from Umm el-Marra Flotation Samples, LB

Provenience square	1030/ 3996	1044/ 4000	1148/ 3878	1148/ 3880	1242/ 3854	1270/ 3928	1373/ 3758	1032/ 3852	1044/ 3852	1068/ 3854	1038/ 3862 N rm-002	1038/ 3860 S rm-002
Lot	12	6	4	8	6	7	6	2	2	4		
Year/sample no.	94	94	94	94	94	97.04	97.06	95	95	95	95	95
Period	LB	LB	LB	LB	LB	LB	LB	LB	LB	LB	LB	LB
Volume (l)	?	?	?	?	15*	8*	15*	0.5*	10	15*	?	10
Charcoal > 2mm (g)	0.31	+	0.27	0.07	–	+	0.03	27.41	6.71	15.36	21.14	5.43
Seed > 2mm (g)	0.18	0.09	0.73	0.30	0.23	0.16	0.23	–	0.03	0.03	+	0.26
Rachis, culm, etc. > 2mm (g)	0.02	–	0.13	+	–	–	–	–	+	–	–	0.01
Charred density (g/l)	n/c	n/c	n/c	n/c	0.02	0.02	0.02	54.82	0.67	1.03	n/c	0.57
Seed/charcoal (g/g)	0.58	n/c	2.70	4.29	n/c	n/c	7.67	–	+	+	+	0.05
Wild seed (#)	302	67	515	186	119	659	424	–	5	1	9	16
Wild/charcoal (#/g)	974	n/c	1907	2657	n/c	n/c	14133	+	1	+	+	3
Wild/cereal (#/g)	795	515	387	503	384	1648	1178	n/c	250	100	n/c	37
Food and cultigen seeds												
Hordeum (g)	0.16	0.05	0.44	0.05	0.06	0.12	0.18	+	–	–	+	0.12
Triticum aestivum/durum (g)	–	0.01	0.09	0.02	–	–	–	–	–	–	–	–
Triticum sp. (g)	0.01	–	–	–	–	+	0.02	–	0.02	–	–	–
Cereal indet.	0.21	0.07	0.80	0.30	0.25	0.28	0.16	–	–	0.01	+	0.31
Lathyrus	–	–	–	1	–	–	–	–	–	–	–	–
Lens	–	–	4	–	–	–	–	–	1	–	–	–
Ficus	2	–	–	–	1	–	–	–	–	2	–	–
Vitis	–	–	–	–	–	–	–	–	–	1	–	–
Wild and weedy seeds												
Apiaceae indet.	–	–	7	–	–	5	–	–	–	–	–	–
Artemisia	2	2	–	–	–	–	–	–	–	–	–	–
Centaurea	–	–	–	–	1	–	1	–	–	–	–	–
Asteraceae indet.	2	–	70	–	–	2	2	–	–	–	–	–
Heliotropium	–	–	–	–	–	–	1	–	–	–	–	–
Brassicaceae indet.	1	–	2	–	1	409	2	–	1	–	–	2
Gypsophila	65	–	22	1	21	–	21	–	–	–	1	3
Silene	–	–	8	–	–	–	–	–	–	–	–	–
cf. *Stellaria*	–	–	–	2	–	4	–	–	–	–	1	–
Caryophyllaceae indet.	–	–	44	–	–	2	81	–	–	–	–	–
cf. *Chara*	–	–	–	–	–	–	–	–	–	–	1	–
Atriplex	–	–	–	–	–	–	–	–	–	–	–	–
Chenopodium	2	–	–	1	1	–	1	–	–	–	–	–
Salsola	–	–	–	–	–	–	1	–	–	–	–	–
Suaeda	2	–	–	2	–	–	–	–	–	–	–	–
Chenopodiaceae indet.	–	–	3	–	–	–	–	–	–	–	–	–
Carex	–	–	–	6	–	–	–	–	–	–	–	–
Astragalus	5	–	26	2	2	–	64	–	–	–	–	–
Prosopis	–	1	–	–	–	–	–	–	–	–	–	–
Trifolium/Melilotus	3	–	11	–	–	–	18	–	–	–	1	2
Trigonella	37	7	39	89	10	3	59	–	1	–	1	–
Trigonella cf. *astroites*	–	–	–	–	–	–	14	–	–	–	–	–
Fabaceae indet.	1	1	5	10	7	1	50	–	–	–	2	–
Teucrium	5	–	2	–	–	–	–	–	–	–	–	–
Ziziphora	5	–	–	15	–	–	–	–	–	–	–	–
Lamiaceae indet.	–	–	16	–	–	–	–	–	–	–	–	–
Liliaceae indet.	–	–	1	–	–	1	3	–	–	–	–	–
Malvaceae indet.	–	–	1	1	–	1	–	–	–	–	–	–
Glaucium	–	–	–	–	3	–	–	–	–	–	–	–
Papaver/Roemeria	–	–	–	–	–	–	1	–	–	–	–	–

Table 5 *(Continued)*

Provenience square	1030/ 3996	1044/ 4000	1148/ 3878	1148/ 3880	1242/ 3854	1270/ 3928	1373/ 3758	1032/ 3852	1044/ 3852	1068/ 3854	1038/ 3862 N rm-002	1038/ 3860 S rm-002
Lot	12	6	4	8	6	7	6	2	2	4		
Year/sample no.	94	94	94	94	94	97.04	97.06	95	95	95	95	95
Period	LB	LB	LB	LB	LB	LB	LB	LB	LB	LB	LB	LB
Aegilops	–	–	1	–	–	1	–	–	–	–	–	–
Eremopyrum	86	6	100	7	48	15	7	–	–	–	2	1
Hordeum	–	–	–	1	–	–	–	–	–	–	–	–
Hordeum cf. *murinum*	–	–	1	–	–	–	–	–	–	–	–	–
Phalaris	2	–	4	–	16	–	2	–	1	–	–	1
Phleum/Eragrostis	3	–	–	–	–	7	5	–	–	–	–	–
Umm.Poaceae-2	2	32	4	12	–	14	45	–	–	–	–	–
Poaceae indet.	35	13	86	12	9	94	21	–	1	1	–	4
Polygonum	–	–	–	–	–	–	1	–	–	–	–	–
Androsace	–	–	14	1	–	–	–	–	–	–	–	–
Reseda	–	–	–	–	–	3	–	–	–	–	–	–
Adonis	2	–	3	–	–	–	–	–	–	–	–	–
Ceratocephalus	2	–	–	–	–	1	3	–	–	–	–	–
Crucianella	–	–	–	–	–	1	–	–	–	–	–	–
Galium	1	–	–	–	–	–	–	–	–	–	–	1
Scrophularia	–	–	–	–	–	19	–	–	–	–	–	–
cf. *Hyoscyamus*	–	–	2	–	–	–	–	–	–	–	–	–
Thymelaea	3	–	–	–	–	–	–	–	–	–	–	–
Valerianella cf. *dentata*	–	–	1	–	–	–	–	–	–	–	–	–
V. vesicaria-type	–	–	1	–	–	–	–	–	–	–	–	–
Peganum harmala	–	–	–	1	–	–	–	–	–	–	–	–
Unknown miscellaneous	36	5	111	23	–	78	23	–	1	–	–	2
Plant parts												
Hordeum int	7	–	3	–	4	13	1	–	–	–	–	–
Triticum aestivum/durum int	–	–	13	–	–	–	–	–	–	–	–	–
T. monococcum/dicoccum sf	–	–	5	–	–	–	–	–	–	–	–	–
Triticum gb	1	–	19	3	–	–	–	–	–	–	–	–
Aegilops gb	1	–	1	–	2	1	–	–	–	–	–	1
Poaceae culm node	19	–	13	–	2	1	–	–	1	–	–	–
Uncharred seeds												
Alkanna	1	–	2	1	–	–	–	–	–	–	–	–
Arnebia decumbens	32	6	748	11	183	1	40	–	7	–	–	10
A. linearifolia	–	–	–	–	–	–	–	–	–	–	–	–
Lithospermum tenuifolia	2	–	13	–	–	–	3	–	2	–	–	3
Moltkia	–	–	–	–	–	–	–	–	–	–	–	–
Boraginaceae indet.	2	–	–	–	–	–	–	–	–	23	109	3

*Indicates estimated volume. Abbreviations: gb = glume base; int = internode; n/c = not calculable; sf = spikelet fork

greens and seeds can be eaten. Two of the inner fruits of coriander were seen in a single MB sample.[59] Van Zeist reports coriander from MB deposits at Tell ed-Der and Hammam et-Turkman.[60] Coriander was relatively common by classical times,[61] but the current examples extend its archaeobotanical range in the MB a few hundred km to the west.

Several safflower achenes (a seedlike fruit) could represent a dye plant. Given EB finds of flower heads from Hammam et-Turkman, van Zeist considers saf-

[59] Miller 1996a, fig. 6a, b.

[60] van Zeist 1984, 119–43; van Zeist et al. 1988.

[61] Zohary and Hopf 1984, 188.

flower to have been cultivated as a dye plant before it was grown for its oil. A few achenes have also been found at Hammam et-Turkman and Selenkahiye.[62]

Wild and Weedy Types

Wild and weedy types constitute a significant part of the assemblage. Most have been determined to genus or family at best, and so it is not possible to provide a detailed discussion of habitat or use. Note, however, that none of the identified types is unexpected, for all are known from the floras of Syria and southeastern Turkey; indeed, most have been recognized in archaeobotanical assemblages from the region. Identified only to genus, most cannot be assigned to particular ecological niches. Although none show clear increases or decreases through time, a few types warrant some additional comment.

Artemisia. Fourteen tiny seeds are tentatively identified as *Artemisia* (sagebrush), a dominant plant in much of the steppe zone of the Near East. In some areas it is thought to have replaced native grasslands through overgrazing, but such small seed numbers cannot illustrate any trends.

Chenopodiaceae. As suggested by their English common names, many of the members of the goosefoot family are salt-tolerant plants (e.g., *Salsola* [saltwort] and *Suaeda* [seablite]). One loose seed of *Atriplex* and several enclosed by bracteoles were seen in two EB samples. There is no reason to assume that these plants were associated with the salt lake, since many of the species grow on the steppe or in fields.

Carex. Sedges (Cyperaceae), such as *Carex,* typically are plants of moist ground and frequently grow along streams and ditches and in low-lying areas.

Fabaceae. Many herbaceous members of the clover family, both wild and cultivated, are favored as fodder. This is true of all of the genera reported here: *Astragalus, Trifolium* or *Melilotus, Medicago,* and *Trigonella.* Some could be field weeds, but many species of *Astragalus* and *Trigonella* are also established plants of the steppe. *Prosopis* is a small shrub. Thanks to a very deep taproot, once it becomes established in agricultural fields it is very difficult to eradicate. Sheep and goat eat the nutritious pods. In antiquity it seems at least sometimes to have been collected for human consumption, judging from a small collection of pods found at Assyrian Nimrud.[63] A single pod segment of *Alhagi* (camel thorn) was also seen. Like *Prosopis,* it has a deep taproot. Most herbivores avoid its spiny branches.

Poaceae. Grasses are generally plants of open ground. Some of those found would be native to the steppe; others would flourish in the disturbed ground of agricultural fields. *Eremopyrum* is the most numerous grass type in these samples. On phytogeographical grounds, the most likely species is *E. bonaepartis.* This species grows in both steppe and field habitats.[64] A very small grass seed designated cf. *Phleum/Eragrostis* is also quite numerous (equivalent to SW.Poaceae-15).[65] Seeds designated cf. *Trachynia distachya* resemble closely the ones illustrated by Miller[66] and van Zeist and Bakker-Heeres.[67] A few seeds resemble SLK-B.[68]

Sanguisorba (=*Poterium*). One EB sample had 23 seeds that look like those of *Sanguisorba;* J. McCorriston suggested this identification, and the seeds compare well with those illustrated by C. Townsend and E. Guest.[69]

Peganum harmala. Wild rue is represented by a two seeds. Because it is avoided by grazers, it tends to increase on overgrazed land. In archaeobotanical samples from northern Mesopotamia, it does not begin to appear until EB,[70] presumably because grazing pressure had reached a critical point at that time.

Discussion

In interpreting charred archaeobotanical assemblages, one first groups samples with similar pyric histories. At Umm el-Marra the samples from the West Area A burned architecture are not directly comparable to those from the deposits that did not result from general burning. The appropriateness of this separation is clear if one examines the data. Not only do the five LB West Area A samples have the most charcoal, and where measurable, the highest densities of charred material, they also have the lowest seed-to-charcoal ratios. This is true when the weight of seeds, including cultigens, is used in the calculation, and when the wild seed count is used. That is, the burnt material is mostly from fallen roof beams or wooden furnishings.

The remaining samples are from different kinds of cultural fill. Archaeobotanists generally consider a range of explanations for the occurrence of plant materials in cultural deposits, most commonly

[62] van Zeist and Waterbolk-van Rooijen 1992, 157–61.
[63] Helbaek 1966, 617.
[64] Feinbrun-Dothan 1986, 166.
[65] Miller 1997b, fig. 6.7d, e.
[66] Miller 1997b, fig. 6.4a.
[67] van Zeist and Bakker-Heeres 1985, fig. 7.1–3.
[68] van Zeist and Bakker-Heeres 1985, fig. 7.4–6; Miller 1997b, fig. 6.6e, f.
[69] Townsend and Guest 1966, pl. 26.
[70] Miller 1991, 156.

Table 6. Archaeobotanical Comparisons between Umm el-Marra and Other Sites

	Umm el-Marra			Sweyhat	Hacinebi
Sample	EB	MB	LB	EB/MB	Chalcolithic
No. of samples	4	8	4	17	23
Seed/charcoal (g/g)	0.82	3.23	3.81	1.13	0.46
Wild/charcoal (#/g)	1391	1220	5000	726*	281
Wild/cereal (#/g)	1418	555	730	5465*	501

*Based on 16 samples; outlier omitted. Source: Miller 1996a, 1997b.

(in Near Eastern sites) crop-processing debris, fuel residues, burnt trash, or some combination of those substances.[71] Attributing a cause of charring to any particular seed or sample is virtually impossible, however. At Umm el-Marra none of the ordinary occupation debris samples stands out as individually interpretable, yet most are probably redeposited hearth sweepings. For example, an MB II oven area (1316/3880-008), where one might expect a high density of charred material, has a lower density of charred material than samples from two pits and a room.

Without reviewing all the arguments here,[72] it seems likely that most of the charred seeds from the cultural fill samples originated in dung fuel, with the exception of the fruit remains. Those samples have a mixed character, with varying proportions of charcoal and seeds of wild and cultivated plants. If crop food remains had been burnt accidentally, one might expect high concentrations relative to weed remains, yet seeds of wild and weedy plants are quite numerous relative to the quantities of cereal remains (for example, a wild-to-cereal [#:g] ratio of 800 is approximately equivalent to eight wild seeds to each cereal grain equivalent). Similarly, one might expect relatively high proportions of wheat relative to barley, since wheat is generally preferred as food; at Umm el-Marra barley predominates in all samples with identified cereal grains. Given this line of reasoning, one LB sample stands out as unusual (1373/3758-006, Southeast Area). From an ashy deposit, it had a low density of charred material (0.02 cereal/volume [g/l]) but an unusually high proportion of seeds, both wild and cultivated. Tentatively interpreted as a bakery (see "Exploratory Excavations: Southeast Area," above), perhaps this sample has a high proportion of crop-cleaning debris.

There are still too few samples to allow firm conclusions about any interpretation. Even so, it is worthwhile to compare some of the general characteristics of the Umm el-Marra samples with those from other sites. In particular, at sites along the Euphrates, the wild and weedy-to-cereal ratio helps monitor ancient reliance on pastoralism (table 6). A high value, as at EB Sweyhat, is thought to indicate a heavy reliance on pastoralism, with herds being grazed in uncultivated land.[73] Roughly contemporary, the EB Umm el-Marra samples have a much lower value for this ratio, which suggests farming was more important than at contemporary Sweyhat. The ratio is even lower in the MB and LB Umm el-Marra samples, which suggests even greater reliance on farming relative to pastoralism.

The seed-to-charcoal ratio and the wild and weedy-to-charcoal ratio (table 6) have been used as a relative measure of tree cover at other sites.[74] The numerator mostly consists of grain, and the ratio would reflect dung fuel relative to wood fuel. Consequently, lower values signify that more wood fuel was available. The higher seed-to-charcoal ratios of the MB could reflect the cutting of woody vegetation for fuel coincident with the revival of urban societies in that period (see "Introduction," above). By this measure, LB wood availability was somewhat further reduced.

There is some indication that the loss of woody vegetation started even earlier. Where EB Umm el-Marra appears to have had more wood fuel than in later times, it had less than Chalcolithic Hacinebi, although they lie in a similar rainfall zone. This result is perhaps not surprising, since fuel-intensive metallurgy developed during the years between the Hacinebi and Umm el-Marra occupations. Compared to EB levels at Sweyhat, Umm el-Marra seems not so poor in wood fuel. The environment around MB and LB Umm el-Marra, however, would have had even less woody vegetation than that at EB Sweyhat (table 6). If anything, the Umm el Marra seed to charcoal ratios are underestimates, because ratios of two samples were not calculable because of low

[71] E.g., Miller and Smart 1984, 5–28; Hillman 1984, 1–41.
[72] See Miller 1996b, 526.
[73] Miller 1997a, 123–32.
[74] Miller 1990, 70–8; 1997a.

amounts of charcoal for the denominator. That is, wood was scarcer than the value of the average seed-to-charcoal ratios suggest.

The values of the wild seed-to-charcoal ratio do not correspond to those of the seed-to-charcoal ratio, which reflects the amount of cereal rather than wild plants. With the small sample numbers involved, one can never discount random variation or functional differences in the deposits sampled. It is also possible that the wild seeds in some periods have high proportions of steppe plants, but in others field weeds predominate. Unfortunately, at the taxonomic levels of family genus (and sometimes even species) it is not possible to have a refined understanding of plant habitats.

The salt lake is one habitat not represented in the plant remains. Several explanations can be proposed for the apparent lack of lacustrine types, the most obvious being that plants growing around the salt lake may not have been suitable for pasture or fodder and were thus unlikely to have been burned. Note that at the Euphrates river sites of the Bronze Age, there is little evidence of seeds of riverine plants, although the wood of the gallery forest was used.[75] One might suppose that the primary use of the lake was salt production, which might not be reflected in the plant remains.

If the examined samples accurately represent the plant remains and if the line of argument presented here is valid, one can argue for the following land use picture. In EB times relatively high proportions of wild seeds relative to cultigens suggest that animals were pastured on the steppe; that is, there were large tracts of pasture land. Even so, grain fields were a significant part of the landscape (e.g., compared to the environs of Sweyhat). Relatively low proportions of seeds relative to charcoal suggests trees were present to some degree. The situation changes a little in MB and LB times. Low proportions of wild seeds suggest animals as well as people were eating grain, and a jump in the proportions of cultigen seeds relative to wood suggests that a broad expanse of agricultural fields lay on a plain essentially bare of trees because of earlier land clearance by humans. Orchards and vineyards are not part of this scene, although one might imagine individual tended trees or small plots maintained for fruit or timber.

It is a little too soon in the analysis to integrate the plant and animal data in anything approaching a definitive way, but it may be useful to report on the discussions between the archaeobotanist and the zooarchaeologist. Evidence suggests that simultaneous with a significant increase in exploitation of the steppe for hunting between the EB and MB periods (the importance of equids rises), we see a decline in the use of the steppe for pasture (the wild-to-cereal ratio declines) and an intensification of agricultural activity (namely, growing fodder for the herds). Perhaps the steppe was reserved for hunting, while flocks of sheep and goat were herded in proximity to the agricultural settlements. In that case, the decline in wild seeds in MB might represent a change in the division of labor (specialized hunters coexisting with farmers). Alternatively, the change might reflect a seasonal distribution of labor, with flocks of domesticated animals being pastured on the steppe for some portion of the year. In either case, dung with abundant wild seeds would not have been brought to the settlement for use as fuel. Too few archaeobotanical and faunal samples have been analyzed to adequately address this issue, however.

A SURVEY IN THE JABBUL PLAIN

An archaeological survey of the region surrounding Tell Umm el-Marra in the central and eastern Jabbul plain was conducted by the joint Johns Hopkins–University of Amsterdam expedition from 5 May to 29 June 1996. Goals included the establishment of a regional ceramic sequence and the documentation of changes in environment, settlement, and land use. While these objectives were only partly attained in this first field season, we are able to offer a preliminary overview of observed changes through time.[76]

The surveyed area extended from the Nahr edh-Dhahab watercourse east to the edge of the Euphrates valley (ca. 35 km), and from the north and east shore of the Jabbul lake north to the arc of low hills bordering the plain (ca. 20–35 km) (fig. 18). The site of Tell Wasta, on a small island in the northwestern part of the Jabbul lake, was also visited, but the western extent of the plain as it approaches Aleppo was outside our survey area. Topographically, the region consists of a flat limestone plain extending from the Jabbul lake to the arc of low rolling hills bordering the plain to the north; local soils are calcium-rich aridis-

[75] van Zeist and Bakker-Heeres 1985; Miller 1997b.

[76] The 1996 survey was planned as the first stage in a multistage regional project. In the future we would hope to investigate off-site features, land use patterns, and selected sites in greater detail. Since surface collection of sites was sometimes hindered by abundant vegetation, we also hope to revisit relevant sites in a drier part of the year to obtain larger sherd samples.

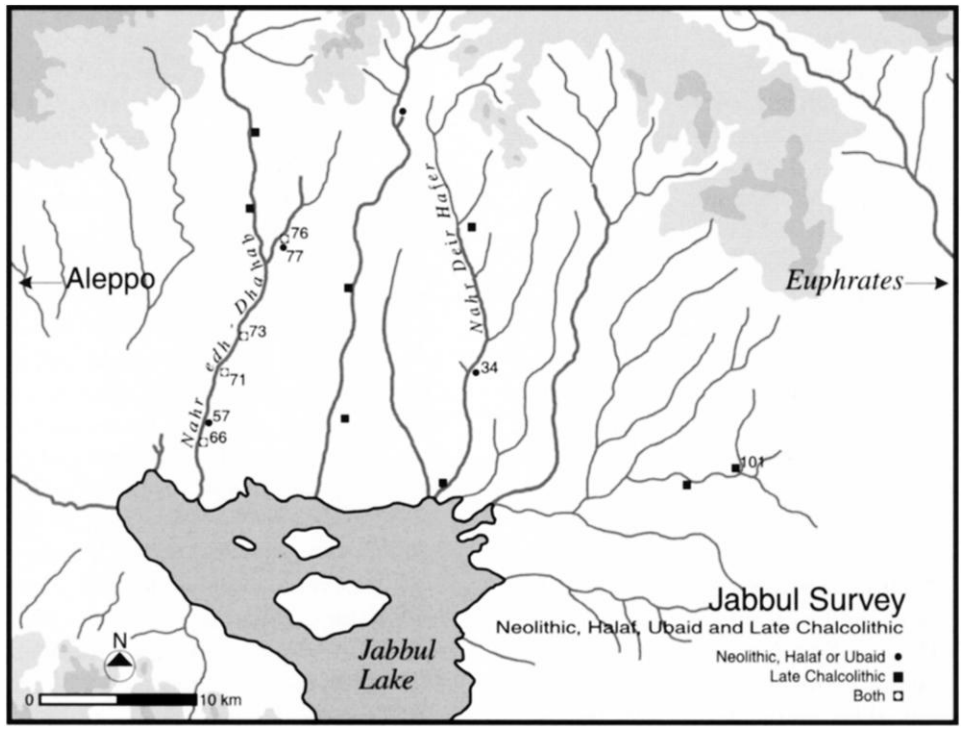

Fig. 18. Ceramic Neolithic, Halaf, Ubaid, and Late Chalcolithic site distribution, Jabbul 1996 survey

ols with caliche horizons within at least 1 m of the surface. Flowing south from the northern hills are wadis that incise the plain and empty into the saline Jabbul lake, forming an autonomous drainage system. Present-day annual precipitation declines from west to east, ranging from over 300 mm in the Nahr edh-Dhahab vicinity to 250–200 mm as one approaches the Euphrates valley.[77] As the largest source of salt in Syria, Jabbul Lake enjoyed considerable economic importance in Medieval and subsequent periods, but earlier salt extraction remains to be documented.

A total of 144 sites were identified, surface collected, and described. Since asphalt and dirt roads allowed access to many sites, travel in the plain was relatively unimpeded, especially after the harvests, when smaller side roads were no longer flooded from field irrigation. Sites were located using 1:200,000 maps, ground-level observation, and local informants.[78] Off-site reconnaissance was limited to the area immediately around each site; in a few cases, more extensive investigations were conducted when the limit of the site was unclear. In addition to mounded sites or loci with surface artifacts, four underground water channels (*qanats*) and seven clusters of tomb shafts were also identified but are not included in the site totals per period listed below. The burial clusters, found in diverse parts of the survey region, included as many as 15 grave shafts dug into bedrock and are tentatively dated to the Hellenistic, Roman, or Late Antique periods.

Of the sites located in 1996, 53 had been visited previously by the British team that conducted an archaeological reconnaissance of the region between Aleppo and the Euphrates in 1939.[79] The latter project was an important pioneering effort but was unavoidably hampered by limited knowledge of local ceramic chronologies. Survey data of varying quality are also available from adjacent regions including the Qoueiq valley to the west, the Madekh region to the southwest, Jebel Shbeit and Jebel Hass to the south, the Sajour drainage to the north, and the Euphrates valley to the east.[80]

Preliminary analysis of our data indicates the presence of continuous occupation in the survey area

[77] Wirth 1971, map 3; Wilkinson 1994, fig. 1; van Zeist and Bottema 1991. We are grateful to T. Beach and S. Luzzader-Beach for the use of their geomorphological data.

[78] At each site a sketch map of the site and its immediate environs was produced, site area was calculated by pacing, and site location was established by a global positioning system. Diagnostic sherds and artifacts were collected from the site surfaces through judgment sampling without the use of transects or grids; multicomponent mounds exceeding 4 ha were divided into quarters for more efficient collection. Curvers assisted the authors in the assignment of survey sherds to chronological periods, and all members of the 1996 team participated in recording and drawing the survey sherds.

[79] Maxwell Hyslop et al. 1942–1943, 8–40.

[80] Matthers 1981; de Maigret 1978, 83–94; Ciafardoni 1992, 37–72; Haase 1983, 69–76; Sanlaville 1982; Wilkinson 1994, 483–520; van Loon 1967.

from at least the Ceramic Neolithic period to the present; evidence of preceramic occupations or sites postdating the first millennium A.D. were not studied for the present report. It is possible that earlier settlement on the plain is underrepresented because of aggradational processes as well as erosional forces that often affect smaller or more ephemeral sites. In the following discussion, we assume that sites significantly larger than their neighbors served as economic and/or administrative centers, but it must be acknowledged that site function need not correlate with site size.[81] Additionally, the possible presence and significance of non-nucleated sites or nomadic pastoralist groups undetected by the survey should be borne in mind.

Five Ceramic Neolithic period sites were identified (ca. 6000–5500 B.C.), characterized by Dark-Faced Burnished Ware and other materials comparable to Amuq A–B.[82] Three Halaf sites (ca. 5500–5000 B.C.)[83] and as many as six Ubaid sites (ca. 5000–4000 B.C.)[84] were noted. In these early periods, settlement was primarily concentrated along the Nahr edh-Dhahab on the western edge of the survey region (fig. 18). The tall medium-sized mounds (ca. 5–10 ha, ca. 25–35 m high) of Tell Saba'in (site 57) and Tell Shirba (site 76) in this zone manifested relatively continuous evidence of occupation for most periods investigated in the survey. Abou Danné, just to the west of our survey region, also belongs in this category of medium-sized mounds with long occupation sequences. Other tells from the Ceramic Neolithic, Halaf, and Ubaid periods were small, measuring 2 ha at most, although the Ubaid occupation at Judeideh (site 66) may have occupied as much as 4 ha.

An increase in settlement (13 sites) is notable in the Late Chalcolithic era (late fifth–fourth millennium B.C.), with communities distributed more evenly over the entire region (fig. 18). Most sites were 1 ha or less, with the exception of Judeideh (site 66) and Tell Shirba (site 76) on the Nahr edh-Dhahab and Mahdum (site 101) in the east, the latter with significant later occupation probably responsible for the majority of the site's 5 ha. Typical Late Chalcolithic ceramics included jars with flaring necks and simple rim bowls in crude chaff-tempered ware comparable to that of Amuq F (fig. 19.1–10).[85] No evidence of southern Mesopotamian-style Uruk pottery was found, facilitating the important conclusion that the Euphrates was the westernmost limit of the Uruk colonial "expansion" from southern Mesopotamia,[86] with the apparent exception of beveled rim bowls found at isolated large sites like Hama and Judeideh (Amuq plain). This finding complements the results obtained by the Qoueiq survey to the west, which also failed to detect any evidence of southern Mesopotamian Uruk material culture.[87] The absence of southern Mesopotamian Uruk materials in the Jabbul region also suggests that salt procurement at the Jabbul lake was not central to the economy of the Habuba Kabira colonial enclave in the Euphrates valley to the east, contrary to G. Buccellati's hypothesis.[88] In the succeeding early third millennium period (=Early EB), only five sites with Amuq G style pottery, such as reserved-slip jars or sinuous-sided bowls (fig. 19.11–18), were noted, distributed over a broad area extending from the Nahr edh-Dhahab to the eastern fringe of the surveyed zone.[89]

---

[81] Schwartz and Falconer 1994, 1–9.

[82] Braidwood and Braidwood 1960, 46–99. The pottery is also comparable to examples from Tell el-Kerkh in the Rouj valley west of Idlib in western Syria (Tsuneki et al. 1997, 1–40). The assemblage includes Dark-Faced Burnished Ware hole-mouthed pots, collared jars, and bowls, as well as Dark-Faced Unburnished Ware and Coarse Simple Ware. Collared and uncollared vessels generally have simple rounded rims, but there are some attestations of a plastic band below the rim. Decoration consists of pattern-burnish cross-hatching, incised lines (vertical and diagonal), and fingernail impressions.

[83] The Halaf sites may not be contemporaneous: the painted ceramics of site 42 are similar to those of Balikh phase IIIC (e.g., low-necked jars with pendant stripes on the interior of the rim), while the Halaf component at Tell Shirba (site 76) compares to the later Balikh phase IIID (e.g. Trichterrandbecher rims and angular neck jars with squared-off rims). Cf. Akkermans 1993, 68–79, 92–109, 134–7; Le Mière and Nieuwenhuyse 1996, 119–284.

[84] Ubaid ceramics included painted and unpainted mineral-tempered hemispherical plain-rim bowls, bead-rim bowls, and hole-mouth and collared-rim pots. General parallels for the wares and decorative schemes are attested at Hammam et-Turkman IV, Tell 'Abr levels 7–2, and Amuq E. Cf. Akkermans 1988a, 181–286; Hammade and Koike 1992, 109–75; Braidwood and Braidwood 1960, 175–225.

[85] Flaring neck jars occur in Amuq F and Hammam et-Turkman VA (Braidwood and Braidwood 1960, fig. 175.2–4; fig. 176.5–9; fig. 178.5, 6, 8; fig. 182.2–9; Akkermans 1988b, pl. 101.48–50). See also Tell Afis area E level 18 (Cecchini and Mazzoni 1998, figs. 1–6).

[86] Schwartz (forthcoming).

[87] Mellaart 1981, 131–326.

[88] Buccellati 1990, 17–40.

[89] It is not unlikely we have underestimated the number of sites dating to this period, given the often "generic" quality of the relevant pottery and the possibility that such occupations are buried under later EB deposits. Cf. Curvers 1989, 173–94; Jamieson 1993. For Amuq G reserved slip, cf. Braidwood and Braidwood 1960, figs. 218–19. For thin-walled, sometimes sinuous-sided plain simple ware bowls with slightly everted rims (fig. 19.16), cf. Braidwood and Braidwood 1960, fig. 206.9–10; fig. 208.5; for jars with everted rim and slight interior depression (fig. 19.11, 13, 15), cf. Braidwood and Braidwood 1960, fig. 210.7–9; for thin-walled ledge rim jars (fig. 19.14), cf. Braidwood and Braidwood 1960, fig. 203.11.

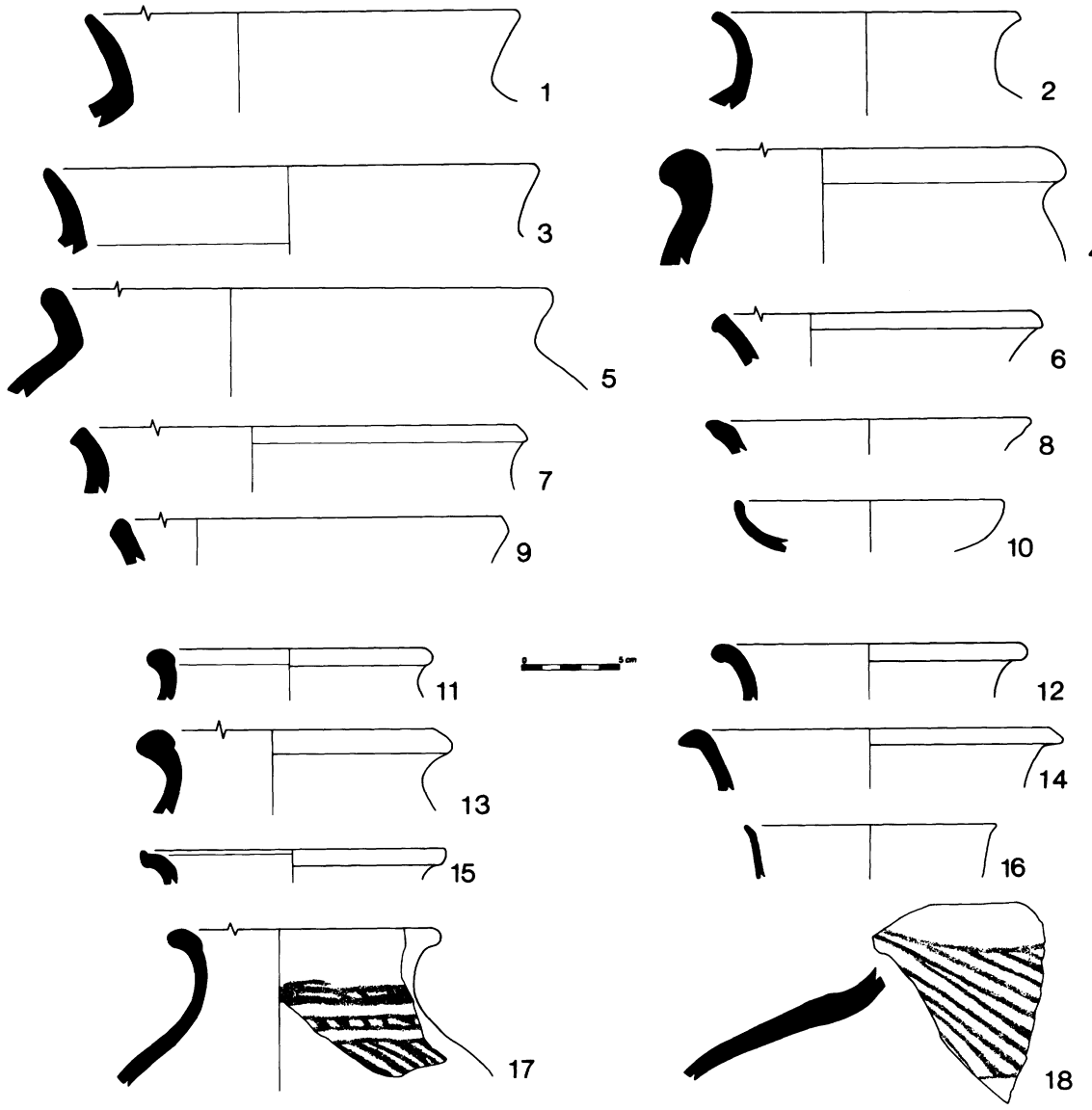

Fig. 19. Late Chalcolithic (1–10) and Early EB (11–18) pottery, Jabbul 1996 survey (site number follows key number): *1*, 33, brown exterior, dark brown interior, dark brown core, medium black sand/lime, handmade; *2*, 84, brown/black/brown sandwich core, light red-brown exterior/interior, fine chaff, some fine sand, handmade; *3*, 84, brown/black/brown sandwich core, reddish brown surface, fine sand, fine chaff, handmade; *4*, 33, light green, light brown core, fine sand; *5*, 84, orange exterior, light brown/gray/brown core, coarse gray sand, medium lime, abundant medium chaff, handmade; *6*, 84, brown surface, black core, fine sand, handmade; *7*, 33, yellow to brown exterior/interior, core brown to black, medium chaff, fine sand, chaff-faced; *8*, 84, red brown to yellow surface, fine chaff/sand, handmade; *9*, 84, red brown surface, light brown core, medium chaff, handmade; *10*, 33, light brown, fine sand/lime, handmade; *11*, 33, red brown surface, brown core, fine chaff/black sand/lime, yellowish white reserved slip line on exterior surface; *12*, 33, green-gray, fine black sand/lime; *13*, 33, brown, fine sand, coarse lime; *14*, 33, light brown, fine sand; *15*, 33, light brown surface, red-brown core, fine lime; *16*, 33, light yellow, light red-brown core, fine sand; *17*, 33, light brown, medium gray sand, fine lime, white reserve slip exterior surface; *18*, 33, gray-green, fine black sand, fine/medium lime, white reserve slip exterior surface.

A significant transformation in the settlement pattern occurs in the mid-to-late third millennium (Mid–Late EB), when the region sees a marked proliferation of settlements (47 sites; fig. 20). This process, coincident with the first period of urban civilization throughout Syria and northern Mesopotamia,[90] is accompanied

[90] Mazzoni 1991, 163–94; Weiss 1983; Schwartz 1994. The ceramic indicators for this period in the Jabbul are those of the "caliciform" assemblage, particularly the thin-walled corrugated goblets and other types manifested in Umm el-Marra IV–V, Amuq I–J, Mardikh IIB, Hama J, and Selenkahiye.

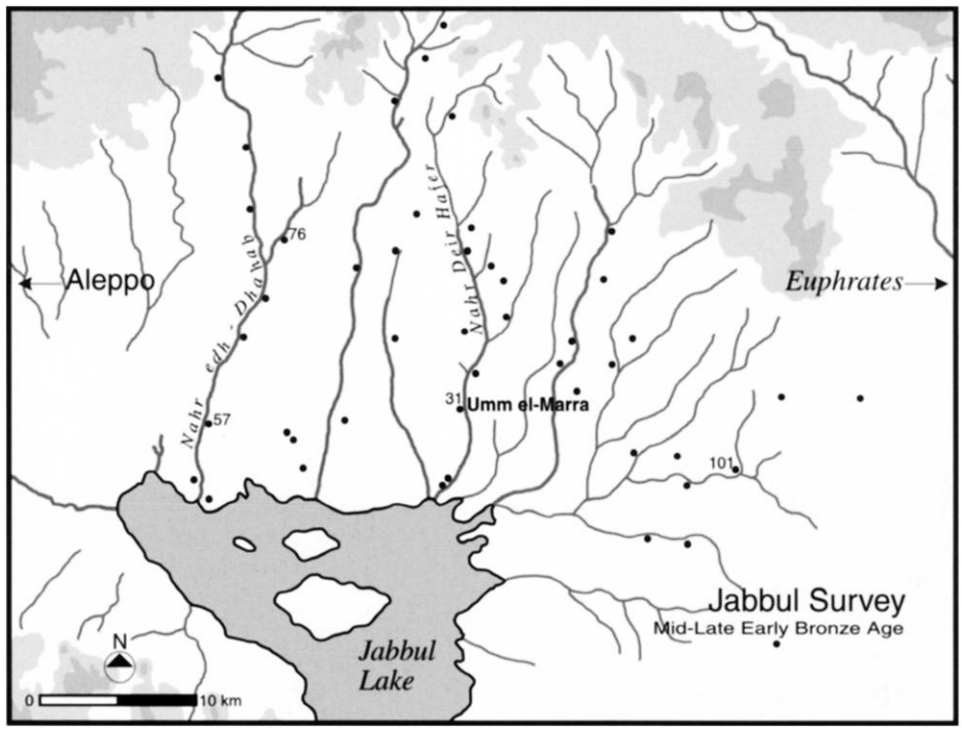

Fig. 20. Mid–Late EB site distribution, Jabbul 1996 survey

by the establishment of Umm el-Marra (site 31) as a large, possibly enclosed regional center in the eastern part of the Jabbul. Umm el-Marra, ca. 25 ha., is larger by far in terms of area than any other site in the survey region but is modest in size compared to the best-known cities of Syria's early urban period, such as Ebla, Mari, and Leilan. Secondary centers of 5 ha or more can be hypothesized at Tell Shirba (site 76) and Saba'in (site 57) along the Nahr edh-Dhahab and at Mahdum (site 101) in the east, as well as at eight communities of 2–3 ha distributed evenly across the landscape, but the majority of settlements were small village-sized communities of 1 ha or less. The large number of sites in the eastern part of the region, beyond the present-day dry-farming limit of 250 mm annual rainfall, may indicate relatively moist conditions in the mid-third millennium or a policy of agricultural maximization associated with the early urban societies of the period.

Our preliminary results imply a degree of abandonment in the early second millennium B.C. ostensibly associated with the urban collapse hypothesized for the end of EB. Some 25 EB sites were deserted, primarily along the Nahr Deir Hafer and in the drier eastern zones. Sherds of MB I date (ca. 2000–1800 B.C.) were only recognized at four sites, although the latter figure is almost certainly too low. A total of 33 MB sites were identified (fig. 21);[91] when subperiods could be identified, MB II was by far the better attested of the two. Despite such indications of occupational gaps, 22 of the 33 MB communities were founded atop EB tells. In MB II (ca. 1800–1600 B.C.), the Jabbul was under the sovereignty of the Amorite-ruled kingdom of Yamhad centered in Aleppo. Umm el-Marra remained the largest settlement in the survey region and may have served as the capital of a Yamhad vassal kingdom, although the Nahr Deir Hafer showed curiously little evidence of additional settlement. Given the pronounced decrease in the number of sites in the drier regions east of Umm el-Marra, the site's position on the eastern fringes of the settled zone in this period may imply that it functioned as a "gateway city" controlling access between the steppe and agricultural zones. These data complement the evidence of the MB II intensified exploitation of the steppe observed by Weber in the Umm el-Marra faunal data (see "An MB Steppe Economy: Specialized Onager Hunting," under "Animal Exploitation," above).

The Late Bronze Age (ca. 1600–1200 B.C.) sees a considerable reduction in the number of sites (11 sites; fig. 21), a common pattern for LB Syria perhaps associated with increasing nomadic pastoralism.[92] Northern Syria was a common arena for

[91] For MB and LB, the pottery types represented in the Umm el-Marra III–II sequence were used as the primary chronological diagnostics. Cf. Curvers and Schwartz 1997; Schwartz and Curvers under "Architecture, Stratigraphy, and Pottery" above.

[92] Wilkinson 1998, 1–23; Curvers 1991. All LB sites in the survey region also had evidence of MB occupation.

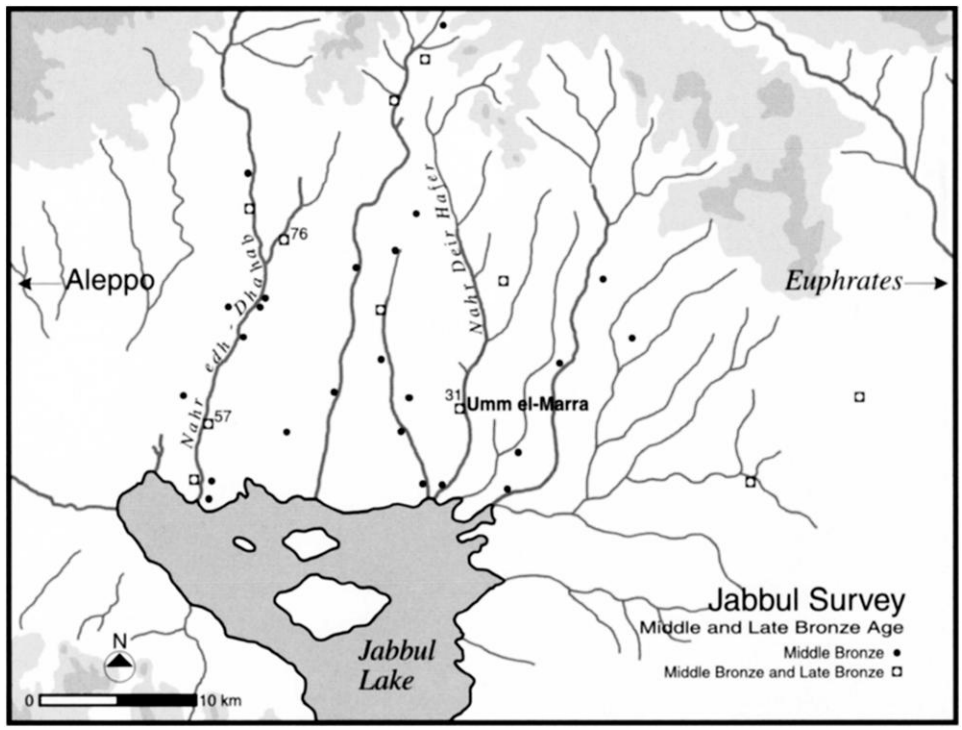

Fig. 21. MB and LB site distribution, Jabbul 1996 survey

struggles between the "great powers" of the day, such as Mitanni, Egypt, Hatti, and Assyria, a circumstance that may also be relevant to the decline in nucleated settlement.[93] Umm el-Marra was still extensively occupied in LB and presumably continued to serve as a regional center, while the dry steppe to the east remained nearly devoid of sedentary occupation.

Settlement rebounded during the Iron Age (ca. 1200–300 B.C.), with a total of 34 sites identified (figs. 22–23). The upsurge in settlement after the LB decline is characteristic of regional patterns throughout Syria in the Iron Age.[94] What remains to be clarified in our region is the degree to which this process can be associated with the Neo-Assyrian imperial period, with its state-sponsored population displacements and resettlements, or with the preceding phase of Aramaean and Luwian dynasts. As in other areas, the traditional Bronze Age center, Umm el-Marra, is abandoned, but no new large center takes its place. It is likely that the region came under the administrative control of towns to the west of Jabbul Lake like Tell Arane, perhaps ancient Arne, original capital of the Aramaean state of Bit-Agusi.[95] The vast majority of settlements in the survey region were small villages under 2 ha, with only two sites on the lower Nahr edh-Dhahab of marginally greater size or sociopolitical significance (3–8 ha), Saba'in (site 57) and the walled site of Misan (site 67). Among the Iron Age diagnostics were bowls with club- or hammer-headed rims (fig. 23.1–7), occasional red-slip bowl and fruit-stand sherds, large storage jars with rope applique (fig. 23.11), and other types documented in the equences from Abou Danné, Tell Afis, Hama, and elsewhere.[96] In sharp contrast to the relatively dense Iron Age settlement of the Jabbul is the scarcity of contemporaneous habitation in the Euphrates valley to the east.[97]

An increase in the number of sites in the survey region is visible in the Hellenistic (49 sites) and Roman (60 sites) periods (fig. 24).[98] Characteristic

[93] For textual references to the effects of such insecurities at Emar on the Euphrates, just east of our survey region, cf. Zaccagnini 1995, 92–109.

[94] Wilkinson 1995, 139–60; Wilkinson and Barbanes (forthcoming); Mazzoni 1994, 319–40.

[95] Matthers 1978, 144–7; Kohlmeyer 1992, 91–100; but cf. Sader 1987, 147. Presumably Sefire, in the same region, was also an important Iron Age center.

[96] Many of the illustrated types are characteristic of seventh–sixth-century B.C. assemblages rather than earlier Iron Age corpora. Cf. Lebeau 1983; Fugmann 1958; Mazzoni 1990, 76–92; Cecchini and Mazzoni 1998; Lehmann 1998, 7–38.

[97] Eidem and Pütt 1999. Exceptions include a *hilani* at Sheikh Hassan and possible indications of a public structure at Tell el-Hajj (Boese 1995; Stucky 1989, 41–4).

[98] Settlement growth in the Hellenistic period is also observed in the Syrian coastal regions by Lund 1993, 27–45.

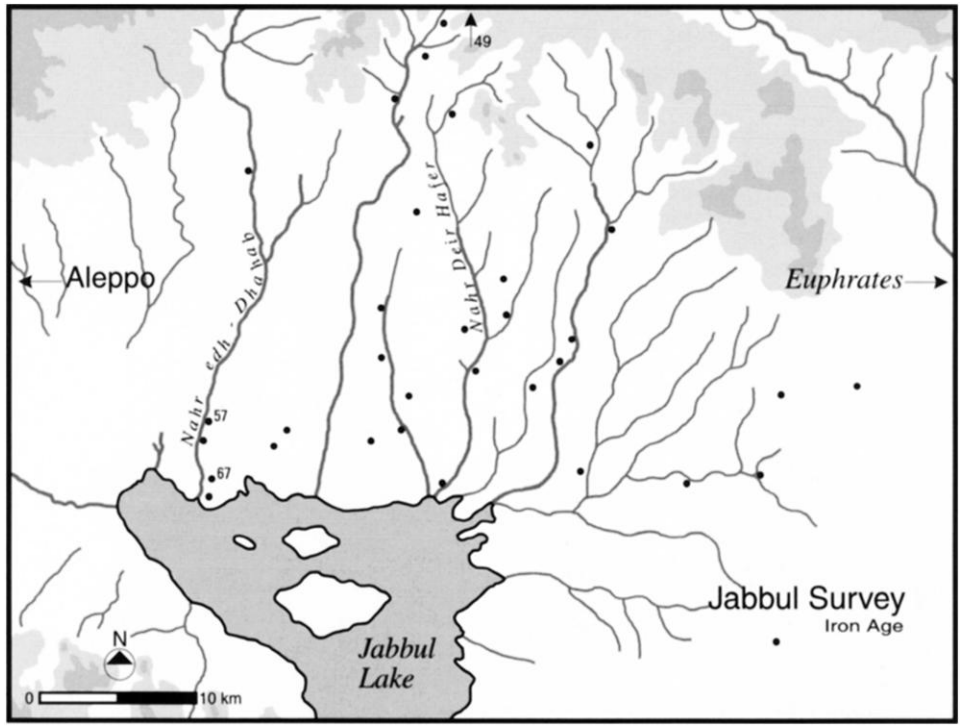

Fig. 22. Iron Age site distribution, Jabbul 1996 survey

ceramics that occurred with some frequency are incurved rim bowls, fish plates, and black and brown gloss wares for the Hellenistic period, and Eastern Terra Sigillata A for the Roman period. Some of the brittle ware cooking pots can also be assigned to the Roman period on the basis of parallels with other Syrian sites.[99] The majority of the Hellenistic and Roman sites fall within a 0.25–5 ha range, although Umm el-Marra reappeared as a large town of as much as 15–20 ha in the Hellenistic period. In the Roman era, Umm el-Marra was apparently much reduced from its Hellenistic extent, and the Jabbul provides an ample manifestation of the Roman Near East as "a world of villages."[100] Since the Euphrates served as the border between the Roman and Parthian empires until the conquest of northern Mesopotamia by Septimius Severus, the survey area can be construed as a frontier zone in the earlier Roman period.[101]

In Byzantine times, historical sources indicate that the site of Jabbul, ancient Gabbula (site 68), was the seat of a bishopric, and our survey data reveal that the Late Antique/Byzantine period was a prosperous era for the region (53 sites; figs. 25–26).[102] In addition to the sites distributed across the plain, an occupation was established on a small island in the Jabbul lake at Tell Wasta (site 144), perhaps associated with a limestone quarry and with salt procurement.[103] In this and the succeeding Early Islamic period (52 sites),[104] the dry steppe in the eastern part of the survey area was

Because of the preliminary nature of our data analysis, we have not yet been able to isolate Persian period remains from earlier Iron Age materials.

[99] Early brittle ware shapes have been found in excavated contexts at Palmyra and Dibsi Faraj (Bylinski 1995, 213–46; Harper 1980, 334–8, fig. C). Hellenistic and Roman material collected by the 1996 survey was also compared to excavated Umm el-Marra Ia–b material and to published data from Abou Danné (Curvers and Schwartz 1997; Tefnin 1980a, 179–201; 1980b, 1–57).

[100] Kennedy 1999, 98.

[101] Isaac 1990, 15.

[102] Jones 1971, 460. Late Roman C bowls, African red slip, and brittle ware cooking pots and casseroles were among the Late Antique types identified. For fine wares, see fig. 26.1–9; for brittle wares, see fig. 26.10–15. Common Late Roman C shapes were types Hayes 3 and 10 (cf. Resafa: Mackensen 1984, 42–8; Konrad 1992, figs. 5.7–11; 6.1–3; 7.5–6).

[103] Given the date of the surface materials on Tell Wasta, it is unlikely that the Louvre's second-millennium B.C. "Jabbul head" originated there, contra Maxwell-Hyslop et al. 1942–1943, 23.

[104] Typical Early Islamic ceramics apart from glazed ware types included brittle ware casseroles with triangular ledge handles and large buff ware bowls with block rims, often with a groove on top. For comparisons of Byzantine and Early Islamic brittle wares, see Harper 1980, figs. C, D; Northedge 1981, 459–61; Konrad 1992, figs. 8.1–15; 9.3–5, 7. For grooved, block-rim bowls, see Northedge 1981; Bartl 1994, pls. 1–7.

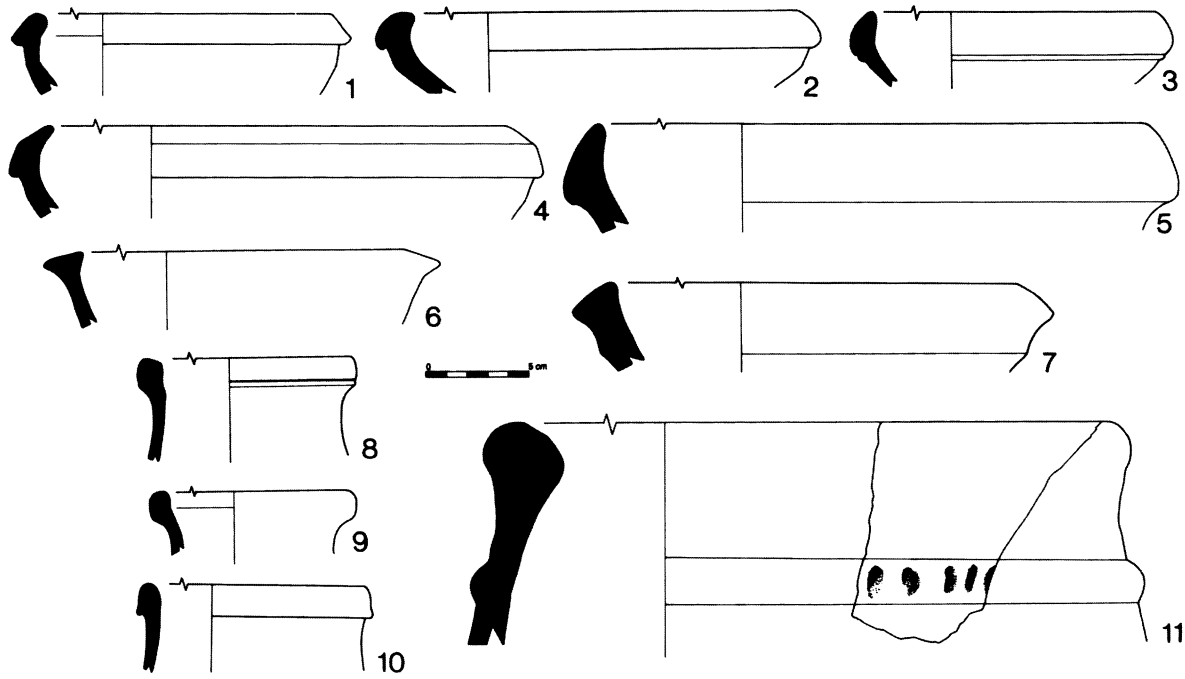

Fig. 23. Iron Age pottery, Jabbul 1996 survey (site number follows key number): *1*, 103, light red, dense fine sand, wheelmade; *2*, 103, light yellow (slip?) exterior/interior, pink core, dense fine sand, wheelmade; *3*, 49, light brown exterior/interior, gray core, fine lime, wheelmade; *4*, 49, light yellow (slip?) exterior/interior, pink core, fine sand; *5*, 49, light yellow exterior/interior (slip?), pink core, fine sand, chaff, wheelmade; *6*, 49, yellow-brown exterior/interior, core pink/brown/pink "sandwich," fine sand; *7*, 16, pink-brown, fine sand; *8*, 103, light yellow, dense fine dark sand, wheelmade; *9*, 103, light yellow, red/brown/red "sandwich" core, fine sand, wheelmade; *10*, 103, light brown, dense fine sand, wheelmade; *11*, 103, light yellow to pink, medium sand/chaff, thumb-impressed appliqué band.

abundantly occupied.[105] Agricultural intensification and new water management technologies are likewise evinced by the qanats appearing to date to this period, given the sites in their proximity. These included examples in the western and central part of the survey region north of site 61, east of site 29, east of site 136, and southeast of site 130. In the latter case, the best-preserved example, the tunnel was ca. 3–4 m deep and 0.8–1 m wide, with regularly spaced vertical shafts sunk from the surface down to the tunnel every 10–15 m. Side canals were observed branching off the main conduit in two instances.[106]

Whereas settlement in the preceding periods tended to be located at well-defined mounded sites, there is a distinct shift to low but extensive loci of occupation in the Late Antique era. The sites frequently consisted of clusters of small house mounds littered with ceramic roof tiles, sometimes to the virtual exclusion of potsherds. While the largest settlements (sites 38, 99, 104, 106, and 127, ca. 10–30 ha) may have functioned as regional centers,[107] no evidence for defensive walls was encountered. Curiously, such large sites are primarily attested in the eastern steppe region. Small sites of 1 ha or less were also common and often appeared to consist of little more than a single house mound. A similar profusion of individual farmsteads or estates was noted in the Tabqa survey area of the Euphrates valley to the east.[108]

Architectural elements were not infrequently found out of context in Late Antique sites, often reused as modern grave markers, including basalt column bases and column shafts, basalt door lintels, and limestone basins, sometimes carved in low relief. Limestone tesserae, coins, and biconical basalt mortars were also commonly noted.

Reviewing our data, we find a relatively sparse distribution of settlement concentrated along the

[105] An extensive occupation of the semiarid steppe east of the Euphrates has also been documented (Einwag 1994, 104). On Byzantine period agricultural intensification, population growth, and exploitation of vacant territory, see Tate 1989, 97–116; Muhesen et al. 1998, 100.

[106] See also van Loon (1967) on underground channels in the Tabqa region and Muhesen et al. (1998).

[107] Sites 107 and 108, Abu Hanaya North and Abu Hanaya South, also are likely to have formed a single large community.

[108] van Loon 1967, 5.

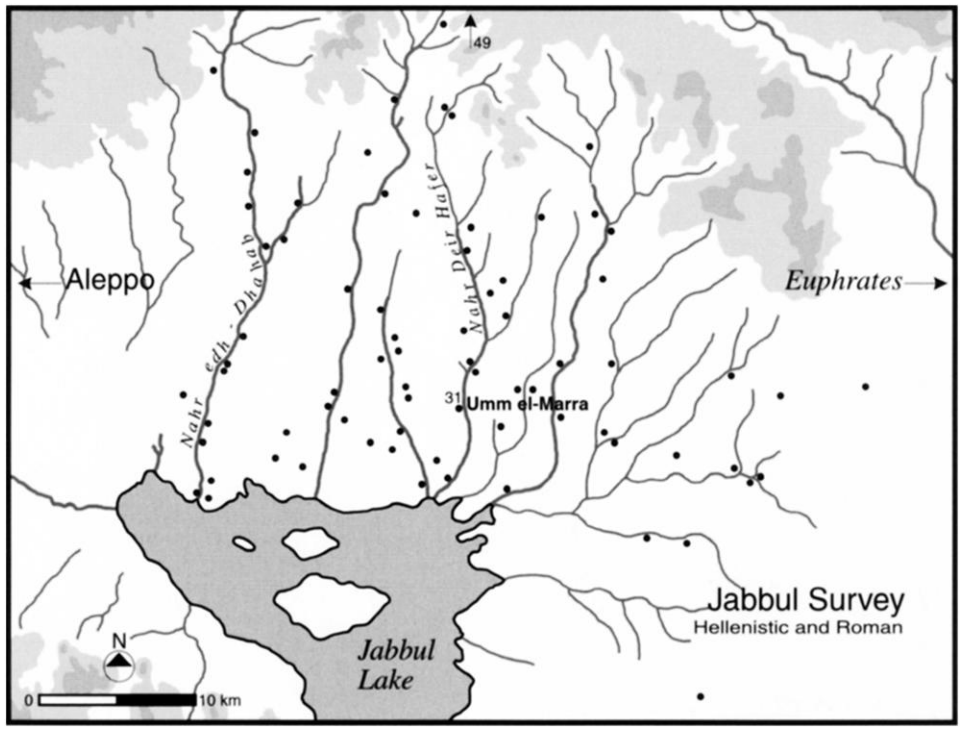

Fig. 24. Hellenistic and Roman site distribution, Jabbul 1996 survey

Nahr edh-Dhahab in the sixth and fifth millennia B.C., a broader distribution in the fourth and early third millennium, and a dramatic increase in settlement in the mid-third millennium, accompanied by the appearance of Umm el-Marra as a large regional center. In this and succeeding periods, the scale of urbanization in the survey region is relatively understated. In the Bronze Age, Umm el-Marra is the only site larger than 10 ha on a plain otherwise characterized by small villages, although secondary centers on the Nahr edh-Dhahab and elsewhere can be hypothesized. It is likely that the area was frequently part of larger regional systems whose most important centers (e.g., Aleppo) were located outside the survey zone. The Jabbul's significance was most probably linked to its strategic location along the east-west route from Aleppo to Mesopotamia. In this context, the role of Umm el-Marra might be understood both as a regional center subservient to Aleppo and a frontier town monitoring and controlling access between steppe and sedentary zones, and between the Euphrates valley and the route west. The presumed importance of the Jabbul lake as a source of salt, attested from medieval and later sources, is uncertain for earlier periods, although occasional sites are located along its north shores and the tell of Jabbul itself (site 68), historically associated with salt collection, was occupied from at least EB times.

CONCLUSIONS

From excavation, ecofactual analysis, and survey—our main research foci—we have been able to acquire new data and pose new questions on various aspects of preurban and early complex societies in the Jabbul region of western Syria. In particular, the alternating cycles of political and economic integration and decentralization can be investigated, although much more research will be necessary in order to acquire a more substantial understanding of these phenomena.

From at least the Ceramic Neolithic period, the Jabbul plain had attracted sedentary populations exploiting the dry farming capacities of the local environment. Settlement began in the rainier, western part of the plain along the Nahr edh-Dhahab and expanded eastward by the fourth millennium B.C. In the mid–late EB, the evidence from the Jabbul duplicates that of other parts of Syro-Mesopotamia in the appearance of a relatively dense regional settlement pattern dominated by a large center (Umm el-Marra) and its subsidiaries. With the foundation of Umm el-Marra and the extensive settlement of the plain, we see a relatively abrupt and simultaneous growth of both urban and rural com-

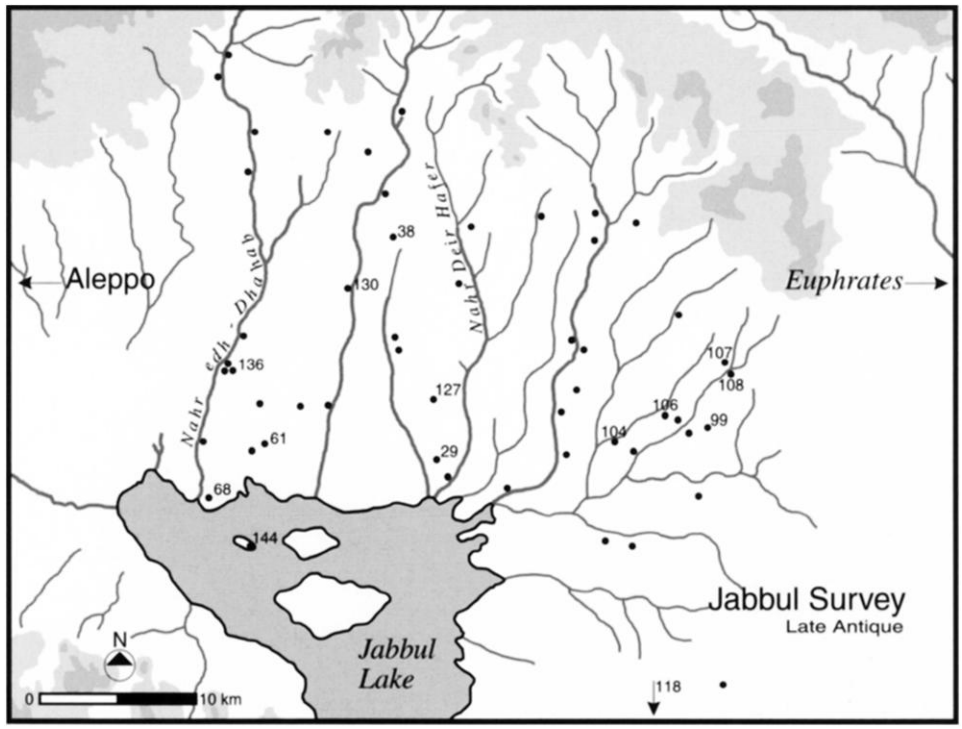

Fig. 25. Late Antique site distribution, Jabbul 1996 survey

munities. Occupation of the drier eastern steppe regions implies strategies of agricultural maximization, perhaps with the encouragement or sponsorship of central authorities. Agricultural intensification is also implied by the trend toward deforestation manifested by the archaeobotanical data. This period marks the apogee of settlement in the plain until the Hellenistic period.

Considering the issue of "collapse" in late EB and MB I, the decentralization observed elsewhere is apparent in the Jabbul region in the abandonment of numerous settlements as well as the desertion of parts of Umm el-Marra. Despite these changes, the ecofactual data do not suggest any clear disruption in economic strategies at Umm el-Marra from EB to MB I. Rather, MB I data exhibit continuity with the trends of the EB: third-millennium animal and plant exploitation patterns continue, as does deforestation. Specialized pottery production also remains in force, with wheelmade, mass-produced vessels predominating, albeit in new styles. These preliminary conclusions may suggest that economic institutions or ideologies from the urbanized EB period survived into the MB I era of decentralization, along the lines of the models advanced by P. Wattenmaker, G. Graffam, and Schwartz .[109]

In MB II the period of urban and state regeneration, Umm el-Marra is refortified and intensively reoccupied, and its animal economy shifts to a focus on onager hunting. An emphasis on the exploitation of wild animal species is surprising in a "second generation" complex society, given expectations of increasingly specialized pastoral economies.[110] The role of the Jabbul within the powerful Yamhad kingdom remains to be explored more fully.

In LB, a period of imperial contentions over northern Syria, the economy at Umm el-Marra shows signs of localization and self-sufficiency, with the abandonment of large-scale onager exploitation. The architecture of the site is concurrently small-scale and domestic in character, with little evidence of central authority or communal fortification. This trend toward localization, along with the reduction of settlement in the plain, may indicate increasing pastoral nomadism as well as the depredations of external powers like Mitanni, Egypt, Hatti, and Assyria conflicting in the region and exacting tributary requirements.

[109] Wattenmaker 1994, 193–208; Graffam 1992, 882–904; Schwartz 1994, 153–74.

[110] Zeder 1998, 55–67.

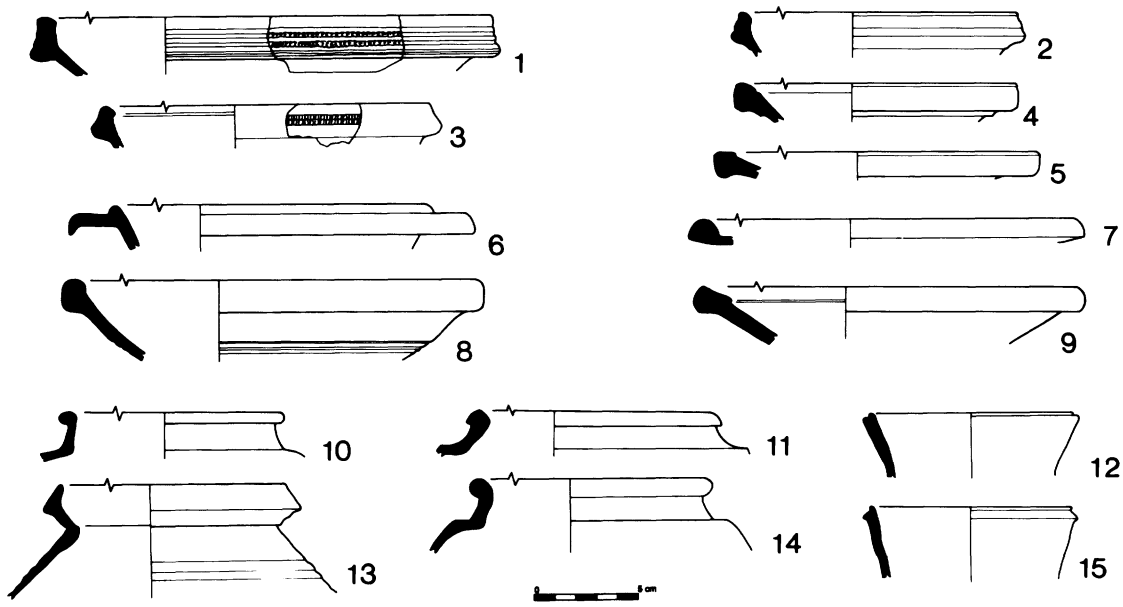

Fig. 26. Late Antique pottery, Jabbul 1996 survey (site number follows key number): *1*, 65, orange-red exterior/interior, orange core, fine sand, dull orange slip, rouletted impression exterior rim; *2*, 17, orange, orange dull slip traces interior/exterior, fine lime; *3*, 55, black exterior, red interior, red-brown core, fine sand, dull slip, rouletted impression exterior rim; *4*, 55, bright orange, dull orange slip exterior/interior, fine sand; *5*, 38, orange core, orange brown surface, dull slip exterior/interior, fine sand; *6*, 104, orange, fine lime, dull slip exterior/interior; *7*, 38, orange, slightly lustrous orange slip, fine sand; *8*, 17, orange, orange dull slip traces exterior/interior, fine sand; *9*, 61, orange, no visible temper; *10*, 38, gray/red exterior, dark red interior, red-brown core, fine lime; *11*, 38, dark brown interior, black exterior, brown red core, fine sand and lime; *12*, 38, brown exterior, red interior, brown core, fine sand, medium lime; *13*, 101, dark brown exterior, dark red brown interior, dark red core, fine sand, smoothed; *14*, 104, black exterior, red brown core/interior, fine sand, smoothed; *15*, 55, black exterior, dark red interior, dark brown core, fine sand.

We have hypothesized that Umm el-Marra consistently served as a Bronze Age regional center and as a frontier community mediating between the steppe and sedentary zones.[111] Although the site's large-scale fortifications in the EB and MB II periods imply urban pretensions, the absence (thus far) of palaces or temples as well as the relative scarcity of elite artifacts might suggest a community emulating urban styles but without a large elite component.

In subsequent periods from Iron Age to Early Islamic, the cyclical trend of retraction and expansion of settlement shifts to a pattern of continuous extensive occupation. Perhaps the inclusion of the survey region within vast imperial polities contributed to a stable sedentary population. Even the struggles between the Parthians/Persians and the Romans/Byzantines failed to result in a significant reduction in the number of settlements in the Jabbul, despite its location at the frontiers of both worlds.

While the utilization of the steppe's resources is common throughout the periods under consideration, there is surprisingly little evidence for the exploitation of Jabbul Lake, contrary to expectations of its economic importance as a source of salt. The botanical and faunal analyses both fail to reveal plant or animal species associated with marshy or saline environments, raising questions of cultural or political restrictions to the lake environment—or to the very existence of the lake in the Bronze Age.

In almost all cases, more data are required to evaluate and refine the above interpretations. Our conclusions on EB and MB I occupation at Umm el-Marra, in particular, are based on small samples that require significant expansion. In future we hope to intensify investigation of the EB to MB transition and the important but rarely examined problem of urban and state regeneration.

[111] For examples of frontier communities in recent Syrian history, see the remarks on Sefire near Aleppo and Dmeir near Damascus in Wirth 1971, 339.

GLENN M. SCHWARTZ
DEPARTMENT OF NEAR EASTERN STUDIES
THE JOHNS HOPKINS UNIVERSITY
BALTIMORE, MARYLAND 21218
SCHWARTZ@JHU.EDU

HANS H. CURVERS
INSTITUUT VOOR PRAE- EN PROTOHISTORIE
UNIVERSITY OF AMSTERDAM
NIEUWE PRINSENGRACHT 130
AMSTERDAM 1018 VZ
THE NETHERLANDS
CURVERSH@SOLIDERE.COM.LB

FOKKE A. GERRITSEN
ARCHEOLOGICAL INSTITUTE
FREE UNIVERSITY
DE BOELELAAN 1105
AMSTERDAM 1081 HV
GERRITSEN_FA@LET.VU.NL

JENNIFER A. MACCORMACK
DEPARTMENT OF ANTHROPOLOGY
YALE UNIVERSITY
NEW HAVEN, CONNECTICUT 06520
JENNIFER.MACCORMACK@YALE.EDU

NAOMI F. MILLER
MUSEUM APPLIED SCIENCE CENTER FOR ARCHAEOLOGY (MASCA)
UNIVERSITY OF PENNSYLVANIA MUSEUM OF ARCHAEOLOGY AND ANTHROPOLOGY
33RD AND SPRUCE STREETS
PHILADELPHIA, PENNSYLVANIA 19104
NMILLERO@SAS.UPENN.EDU

JILL A. WEBER
DEPARTMENT OF ANTHROPOLOGY
UNIVERSITY OF PENNSYLVANIA MUSEUM OF ARCHAEOLOGY AND ANTHROPOLOGY
33RD AND SPRUCE STREETS
PHILADELPHIA, PENNSYLVANIA 19104
JWEBER@SAS.UPENN.EDU

Works Cited

Akkermans, P. 1988a. "The Period IV Pottery." In *Hammam et-Turkman.* Vol. 1, edited by M. van Loon, 181–286. Istanbul: Nederlands Historisch-Archaeologisch Instituut te Istanbul.

———. 1988b. "The Period V Pottery." In *Hammam et-Turkman.* Vol. 1, edited by M. van Loon, 287–349. Istanbul: Nederlands Historisch-Archaeologisch Instituut te Istanbul.

———. 1993. *Villages in the Steppe: Later Neolithic Settlement and Subsistence in the Balikh Valley, Northern Syria.* Ann Arbor: International Monographs in Prehistory.

———, ed. 1996. *Tell Sabi Abyad: The Late Neolithic Settlement.* 2 vols. Istanbul: Nederlands Historisch-Archaeologisch Instituut te Istanbul.

Alizadeh, A. 1985. "A Protoliterate Kiln from Chogha Mish." *Iran* 23:39–50.

Archi, A. 1998. "The Regional State of Nagar According to the Texts of Ebla." In *Subartu.* Vol. 4, *About Subartu,* edited by M. Lebeau, 1–16. Leuven: Brepols.

Bartl, K. 1994. *Frühislamische Besiedlung im Balih-Tal/Nordsyrien.* Berliner Beiträge zum Vorderen Orient 15. Berlin: Dietrich Reimer Verlag.

Bates, D., and S. Lees. 1977. "The Role of Exchange in Productive Specialization." *American Anthropologist* 79:824–41.

Boese, J. 1995. *Ausgrabungen in Tell Sheikh Hassan.* Schriften zur vorderasiatischen Archäologie 5. Saarbrücken: Saarbrücker Druckerei und Verlag.

Boessneck, J., and A. von den Driesch. 1989. "Die Faunreste vom Tell Halawa am Assad-See/Nordsyrien (Drittes und Anfang zweites Jahrtausend v. Chr.)." In *Halawa 1980–1986,* edited by W. Orthmann, 113–51. Bonn: Habelt.

Bounni, A. 1979. "Preliminary Report on the Archaeological Excavations at Tell el-ʿAbd and ʿAnab al-Safinah (Euphrates) 1971–1972." *AASOR* 44:49–62.

Braidwood, R., and L. Braidwood. 1960. *Excavations in the Plain of Antioch.* University of Chicago Oriental Institute Publications 61. Chicago: University of Chicago Press.

Buccellati, G. 1990. "Salt at the Dawn of History: The Case of the Bevelled-Rim Bowls." In *Resurrecting the Past: A Joint Tribute to Adnan Bounni,* edited by P. Matthiae, M. van Loon, and H. Weiss, 17–40. Leiden: Nederlands Instituut voor het Nabije Oosten.

Burney, C. 1964. "The Excavations at Yanik Tepe, Azerbaijan, 1962." *Iraq* 26:54–61.

Bylinski, J. 1995. "A IIIrd Century Open-Court Building in Palmyra. Excavation Report." *DM* 8:213–46.

Cavallo, C. 1996. "The Animal Remains: A Preliminary Account." In Akkermans 1996, 2:475–520.

Cecchini, S., and S. Mazzoni. 1998. *Tell Afis (Siria): Scavi sull'acropoli 1988–1992: The 1988–1992 Excavations on the Acropolis.* Ricerche di archeologia del Vicino Oriente 1; Tell Afis 1. Pisa: ETS.

Ciafardoni, P. 1992. "Insediamenti aramaici e pre-aramaici nella regione di Idlib." In *Tell Afis e l'età del ferro,* edited by S. Mazzoni, 37–72. Pisa: Giardini.

Cooper, E. 1998. "The EB–MB Transitional Period at Tell Kabir, Syria." In *Espace naturel, espace habité en Syrie du nord (10e–2e millénaires av. J-C.),* edited by M. Fortin and O. Aurenche, 271–80. Bulletin of the Canadian Society for Mesopotamian Studies 33. Lyon: Maison de l'Orient Méditerranéen.

Curvers, H. 1989. "The Beginning of the Third Millennium in Syria." In *To the Euphrates and Beyond: Archaeological Studies in Honour of Maurits N. van Loon,* edited by O. Haex, H. Curvers, and P. Akkermans, 173–94. Rotterdam: A.A. Balkema.

———. 1991. "Bronze Age Society in the Balikh Drainage (Syria)." Ph.D. diss., University of Amsterdam.

Curvers, H., and G. Schwartz. 1997. "Umm el-Marra, a Bronze Age Urban Center in the Jabbul Plain, Western Syria." *AJA* 101:201–39.

de Maigret, A. 1978. "Fluttuazioni territoriali e caratter-

istiche tipologiche degli insediamenti nella regione del Matah (Siria): Nota preliminare." In *Atti del 1 convegno italiano sul vicino oriente antico,* 83–94. Rome: Centro per le antichita e la storia dell'arte del Vicino Oriente.

Doyen, J.-M. 1986. "L'outillage en os des sites de Tell Abou Danné et d'Oum el-Marra (campagnes 1975–1983): Quelques aspects de l'artisanat en Syrie du nord du III^{ème} au I^{er} millénaire." *Akkadica* 47:30–74.

Dussaud, R. 1926. "L'art syrien du deuxième millénaire avant notre ère." *Syria* 7:336–46.

Eidem, J., and K. Pütt. 1999. "Danish Excavations in the Tishrin Dam Area." In *Archaeology of the Upper Syrian Euphrates: The Tishrin Dam Area: Proceedings of the International Symposium Held at Barcelona, January 28–30th 1998,* edited by G. del Olmo Lete and J.-L. Montero Fenollós. Barcelona: Editorial AUSA.

Einwag, B. 1994. "West Jezireh Survey." In "Archaeology in Syria," by H. Weiss. *AJA* 98:103–4.

Eisenmann, V. 1986. "Comparative Osteology of Modern and Fossil Horses, Half-Asses, and Asses." In Meadow and Uerpmann 1986, 67–116.

Feinbrun-Dothan, N. 1986. *Flora Palaestina.* Vol. 4. Jerusalem: Israel Academy of Sciences and Humanities.

Finkbeiner, U. 1995. "Tell el-'Abd: Vorläufiger Bericht über die Ausgrabungen 1992 und 1993." *DM* 8:56.

Forbes, H. 1989. "Of Grandfathers and Grand Theories: The Hierachised Ordering of Responses to Hazard in a Greek Rural Community." In *Bad Year Economics: Cultural Responses to Risk and Uncertainty,* edited by P. Halstead and J. O'Shea, 87–97. Cambridge: Cambridge University Press.

Fortin, M., and O. Aurenche, eds. 1998. *Espace naturel, espace habité en Syrie du nord (10^{e}–2^{e} millénaires av. J-C.).* Bulletin of the Canadian Society for Mesopotamian Studies 33. Lyon: Maison de l'Orient Méditerranéen.

Fugmann, E. 1958. *Hama: Fouilles et recherches 1931–1938.* Vol. 2, pt. 1, *L'architecture des périodes pré-Héllenistiques.* Copenhagen: Nationalmuseet.

Gerstenblith, P. 1983. *The Levant at the Beginning of the Middle Bronze Age.* Philadelphia: American Schools of Oriental Research.

Graffam, G. 1992. "Beyond State Collapse: Rural History, Raised Fields, and Pastoralism in the South Andes." *American Anthropologist* 94:882–904.

Green, A. 1983. "Neo-Assyrian Apotropaic Figurines." *Iraq* 45:87–96.

Groves, C.P., and D.P. Willoughby. 1981. "Studies on the Taxonomy and Phylogeny of the Genus *Equus,* 1: Subgeneric Classification of the Recent Species." *Mammalia* 45:321–54.

Haase, C. 1983. "Ein archäologischer Survey im Gabal Sbet und im Gabal al-Ahass." *DM* 1:69–76.

Hammade, H., and Y. Koike. 1992. "Syrian Archaeological Expedition in the Tishreen Dam Basin, Excavations at Tell al-'Abr 1990 and 1991." *DM* 6:109–478.

Hansen, D. 1978. "Al-Hiba (1968–1976)." *Sumer* 34:72–85.

Harper, R. 1980. "Athis-Neocaesareia-Qasrin-Dibsi Faraj." In *Le moyen Euphrate,* edited by J. Margueron 327–48. Leiden: E.J. Brill.

Helbaek, H. 1966. "The Plant Remains from Nimrud." In *Nimrud and Its Remains.* Vol. 2, edited by M. Mallowan, 613–20. London: Collins.

Hillman, G. 1984. "Interpretation of Archaeological Plant Remains: The Application of Ethnographic Models from Turkey." In *Plants and Ancient Man: Studies in Palaeoethnobotany: Proceedings of the Sixth Symposium of the International Work Group for Palaeoethnobotany, Groningen, 30 May–3 June 1983,* edited by W. van Zeist and W. Casparie, 1–41. Rotterdam: A.A. Balkema.

Isaac, B. 1990. *The Limits of Empire: The Roman Army in the East.* Oxford: Clarendon Press.

Jamieson, A. 1993. "The Euphrates Valley and Early Bronze Age Ceramic Traditions." *Abr-Nahrain* 31:36–92.

Jans, G., and J. Brentschneider, with a contribution by W. Sallaberger. 1998. "Wagon and Chariot Representations in the Early Dynastic Glyptic: 'They Came to Tell Beydar with Wagon and Equid.'" In *Subartu.* Vol. 4, *About Subartu,* edited by M. Lebeau, 155–94. Leuven: Brepols.

Jones, A. 1971. *The Cities of the Eastern Roman Provinces.* Oxford: Clarendon Press.

Kennedy, D. 1999. "Greek, Roman and Native Cultures in the Roman Near East." In *The Roman and Byzantine Near East.* Vol. 2, *Some Recent Archaeological Research,* edited by J. Humphrey, 76–106. *JRA* Suppl. 31. Ann Arbor, Mich.: Journal of Roman Archaeology.

Kohlmeyer, K. 1992. "Drei Stelen mit Sin-Symbol aus Nordsyrien." In *Von Uruk nach Tuttul: Eine Festschrift für Eva Strommenger,* edited by B. Hrouda, S. Kroll, and P. Spanos, 91–100. Munich: Profil.

Konrad, M. 1992. "Flavische und spätantike Bebauung unter der Basilik B von Resafa-Sergiupolis." *DM* 6:313–402.

Lebeau, M. 1983. *La céramique de l'âge du fer II–III à Tell Abou Danné, avec ses rapports avec la céramique contemporaine en Syrie.* Paris: Éditions Recherche sur les civilisations, Comité belge de recherches historiques, épigraphiques et archéologiques en Mésopotamie.

———, ed. 1998. *Subartu.* Vol. 4, *About Subartu.* Leuven: Brepols.

Lehmann, G. 1998. "Trends in the Local Pottery Development of the Late Iron Age and Persian Period in Syria and Lebanon, ca. 700 to 300 B.C." *BASOR* 311:7–38.

Le Mière, M., and O. Nieuwenhuyse. 1996. "The Prehistoric Pottery." In *Tell Sabi Abyad: The Late Neolithic Settlement.* Vol. 1, edited by P. Akkermans, 119–284. Istanbul: Nederlands Historisch-Archaeologisch Instituut te Istanbul.

Liebowitz, H. 1988. *Terra-Cotta Figurines and Model Vehicles. BibM* 22. Malibu: Undena Publications.

Lund, J. 1993. "The Archaeological Evidence for the Transition from the Persian Period to the Hellenistic Age in Northwestern Syria." *Transeuphratène* 6:27–45.

McCown, D., and R. Haines. 1967. *Nippur.* Vol. 1. Chicago: University of Chicago Press.

Mackenson, M. 1984. *Resafa.* Vol. 1, *Eine befestigte spätantike Anlage vor den Stadtmauern von Resafa: Ausgrabungen und spätantike Kleinfunde eines Survey im Umland von Resafa-Sergiupolis.* Mainz: von Zabern.

Mander, P. 1994. *An Archive of Kennelmen and Other Workers in Ur III Lagash.* Naples: Istituto universitario orientale.

Marcus, J. 1989. "From Centralized Systems to City-States: Possible Models for the Epiclassic." In *Mesoamerica after the Decline of Teotihuacan AD 700–900,* edited by R. Diehl and J.C. Berlo, 201–8. Washington, D.C.: Dumb-

arton Oaks Research Library and Collection.
———. 1992. "Dynamic Cycles of Mesoamerican States." *NatGeogRes* 8:392–411.
———. 1998. "The Peaks and Valleys of Ancient States: An Extension of the Dynamic Model." In *Archaic States,* edited by G. Feinman and J. Marcus, 59–94. Santa Fe: School of American Research Press.
Margueron, J., ed. 1980. *Le moyen Euphrate.* Leiden: E.J. Brill.
Matthers, J. 1978. "Tell Rifa'at 1977: Preliminary Report of an Archaeological Survey." *Iraq* 40:119–62.
———, ed. 1981. *The River Qoueiq, Northern Syria, and Its Catchment. BAR-IS* 98. Oxford: British Archaeological Reports.
Matthiae, P. 1997a. "Ebla and Syria in the Middle Bronze Age." In *The Hyksos: New Historical and Archaeological Perspectives,* edited by E. Oren, 379–414. Philadelphia: University Museum, University of Pennsylvania.
———. 1997b. "Tell Mardikh 1977–1996: Vingt ans de fouilles et de découvertes: La renaissance d'Ebla amorrhéenne." *Akkadica* 101:1–29.
Maxwell Hyslop, R., J. du Plat Taylor, M.V. Seton-Williams, and J.D'A. Waechter. 1942–1943. "An Archaeological Survey of the Plain of Jabbul, 1939." *PEQ* 74:8–40.
Mazzoni, S. 1990. "Tell Afis and the Chronology of the Iron Age in Syria." *AAS* 40:76–92.
———. 1991. "Ebla e la formazione della cultura urbana in Siria." *PP* 46:163–94.
———. 1994. "Aramaean and Luwian New Foundations." In *Nuove fondazioni nel vicino oriente antico: Realtà e ideologia,* edited by S. Mazzoni, 319–40. Pisa: Giardini.
Meadow, R. 1986. "Some Equid Remains from Çayönü, Southeastern Turkey." In *Equids in the Ancient World.* Vol. 1., edited by R. Meadow and H.-P. Uerpmann 1986, 266–301. Wiesbaden: Reichert.
Meadow, R., and H.-P. Uerpmann, eds. 1986. *Equids in the Ancient World.* Vol. 1. Wiesbaden: Reichert.
Mellaart, J. 1981. "The Prehistoric Pottery from the Neolithic to the Beginning of E.B. IV." In *The River Qoueiq, Northern Syria, and Its Catchment,* edited by J. Matthers, 131–326. *BAR-IS* 98. Oxford: British Archaeological Reports.
Miller, N. 1990. "Clearing Land for Farmland and Fuel in the Ancient Near East." *MASCAP* suppl. to vol. 7: 70–8.
———. 1991. "The Near East." In *Progress in Old World Palaeoethnobotany,* edited by W. van Zeist, K. Wasylikowa, and K.-E. Behre, 133–60. Rotterdam: A.A. Balkema.
———. 1996a. "Archaeobotanical Remains from Hacinebi, 1995 Excavation." MASCA Ethnobotanical Laboratory Report 17. On file, University of Pennsylvania Museum, Philadelphia.
———. 1996b. "Seed-Eaters of the Ancient Near East: Human or Herbivore?" *CurrAnthr* 37:521–8.
———. 1997a. "Farming and Herding Along the Euphrates: Environmental Constraint and Cultural Choice (Fourth to Second Millennia B.C.)." In *Subsistence and Settlement in a Marginal Environment: Tell es-Sweyhat, 1989–1995 Preliminary Report,* by R. Zettler, 123–32. MASCA Research Papers in Science and Archaeology 14. Philadelphia: Museum Applied Science Center for Archaeology, University of Pennsylvania Museum of Archaeology and Anthropology.
———. 1997b. "Sweyhat and Hajji Ibrahim: Some Archaeobotanical Samples from the 1991 and 1993 Seasons." In *Subsistence and Settlement in a Marginal Environment: Tell es-Sweyhat, 1989–1995 Preliminary Report,* by R. Zettler, 95–122. MASCA Research Papers in Science and Archaeology 14. Philadelphia: Museum Applied Science Center for Archaeology, University of Pennsylvania Museum of Archaeology and Anthropology.
Miller, N., and T. Smart. 1984. "Intentional Burning of Dung as Fuel: A Mechanism for the Incorporation of Charred Seeds into the Archaeological Record." *Journal of Ethnobiology* 4:5–28.
Muhesen, S., J. Besançon, B. Geyer, and R. Jaubert. 1998. "Les marges arides de la Syrie du nord: Chronique d'une prospection géo-archéologique 1997." *Chronique archéologique en Syrie* 2:99–102.
Nigro, L. 1998a. "Ebla and the Ceramic Provinces of Northern Syria in the Middle Bronze Age: Relationships and Interconnections with the Pottery Horizons of Upper Mesopotamia." In *Subartu.* Vol. 4, *About Subartu,* edited by M. Lebeau, 271–304. Leuven: Brepols.
———. 1998b. "The Middle Bronze Pottery Horizon of Northern Inner Syria on the Basis of the Stratified Assemblages of Ebla and Hama." In *La céramique de l'âge du bronze en Syrie, un point sur la question,* edited by M. al-Maqdissi, V. Matoïan, and C. Nicolle. Damascus: n.p.
Northedge, A. 1981. "Selected Late Roman and Islamic Coarse Wares." In *The River Qoueiq, Northern Syria, and Its Catchment,* edited by J. Matthers, 459–72. *BAR-IS* 98. Oxford: British Archaeological Reports.
Orthmann, W. 1981. *Halawa 1977–1979.* Bonn: Habelt.
———, ed. 1989. *Halawa 1980–1986.* Bonn: Habelt.
Peltenburg, E. 1997. "Jerablus-Tahtani." In "Archaeology in Syria," by H. Weiss. *AJA* 101:122–3.
Peltenburg, E., et al. 1996. "Jerablus-Tahtani, Syria, 1992–4: Preliminary Report." *Levant* 27:1–28.
———. 1997. "Jerablus Tahtani, Syria, 1996: Preliminary Report." *Levant* 29:1–18.
Rossmeisl, I., and P. Venema. 1988. "The Other Clay Finds." In *Hammam et-Turkman.* Vol. 1, edited by M. van Loon, 561–604. Istanbul: Nederlands Historisch-Archaeologisch Instituut te Istanbul.
Sader, H. 1987. *Les états araméens de Syrie depuis leur fondation jusqu'à leur transformation en provinces assyriennes.* Beirut: Orient-Institut der Deutschen Morgenlandischen Gesellschaft.
Sanlaville, P., ed. 1985. *Holocene Settlement in North Syria: Résultats de deux prospections archéologiques effectuées dans la région du nahr Sajour et sur le haut Euphrate syrien. BAR-IS* 238. Oxford: British Archaeological Reports.
Schwartz, G. 1994. "Before Ebla: Models of Pre-State Political Organization in Syria and Northern Mesopotamia." In *Chiefdoms and Early States in the Near East: The Organizational Dynamics of Complexity,* edited by G. Stein and M. Rothman, 153–74. Madison, Wis.: Prehistory Press.
———. Forthcoming. "Syria and Uruk Expansion." In *Uruk Mesopotamia: Cross-Cultural Interaction and Early States,* edited by M. Rothman. Sante Fe: School of American Research.
Schwartz, G., and S. Falconer. 1994. "Rural Approaches to Social Complexity." In *Archaeological Views from the*

Countryside: Village Communities in Early Complex Societies, edited by G. Schwartz and S. Falconer, 1–9. Washington, D.C.: Smithsonian Institution Press.

Seger, J. 1978. "The Middle Bronze II Fortifications at Shechem and Gezer: A Hyksos Retrospective." *ErIsr* 12:34–45.

Stein, G. 1998. "Heterogeneity, Power and Political Economy: Some Current Research Issues in the Archaeology of Old World Complex Societies." *Journal of Archaeological Research* 6:1–44.

Stein, G., and M. Rothman, eds. 1994. *Chiefdoms and Early States in the Near East: The Organizational Dynamics of Complexity.* Madison, Wis.: Prehistory Press.

Strommenger, E. 1980. *Habuba Kabira: Eine Stadt vor fünftausend Jahre.* Mainz: von Zabern.

Stucky, R. 1989. "Ein Basaltkapitell des frühen 1. Jts. v. Chr. von Tell el-Hajj (Syrien)." *DM* 4:41–4.

Tate, G. 1989. "La Syrie à l'époque byzantine: Essai de synthèse." In *Archéologie et histoire de la Syrie.* Vol. 2, edited by W. Orthmann and M. Dentzer, 97–116. Saarbrücken: Saarbrücker Druckerei und Verlag.

Tefnin, R. 1979. "Tell Abou Danné, une ville fortifiée de l'âge du bronze en Syrie du nord." *Archéologia* 129:42–50.

———. 1980a. "Deux campagnes de fouilles au Tell Abou Danné (1975–1976)." In *Le moyen Euphrate*, edited by J. Margueron, 179–201. Leiden: E.J. Brill.

———. 1980b. "Les niveaux supérieurs du Tell Abou Danné." *SMS* 3/3:1–57.

———. 1983. "Aperçu sur neuf campagnes de fouilles belges aux tells Abou Danné et Oumm el-Marra (1975–1983)." *AAS* 33/2:141–52.

Townsend, C., and E. Guest. 1966. *Flora of Iraq.* Vol. 2. Baghdad: Ministry of Agriculture.

Tsuneki, A., et al. 1997. "First Preliminary Report of the Excavations at Tell el-Kerkh (1997), Northwestern Syria." *Bulletin of the Ancient Orient Museum* 18:1–40.

Tubb, J. 1983. "The MB IIA Period in Palestine: Its Relationship with Syria and Its Origin." *Levant* 15:49–62.

Uerpmann, H.-P. 1986. "Halafian Equid Remains from Shams ed-Din Tannira in Northern Syria." In *Equids in the Ancient World.* Vol. 1., edited by R. Meadow and H.-P. Uerpmann 1986, 246–65. Wiesbaden: Reichert.

———. 1991. "Equus africanus in Arabia." In *Equids in the Ancient World*, vol. 2, edited by R. Meadow and H.-P. Uerpmann, 12–33. Wiesbaden: Reichert.

Van Lerberghe, K. 1996. "The Livestock." In *Subartu*, vol. 2, *Administrative Documents from Tell Beydar*, edited by F. Ismail, W. Sallaberger, P. Talon, and K. Van Lerberghe, 107–18. Leuven: Brepols.

van Loon, M. 1967. *The Tabqa Reservoir Survey 1964.* Damascus: Direction Générale des Antiquités et des Musées.

———. 1973. "First Results of the 1972 Excavations at Tell Selenkahiye." *AAS* 23:145–58.

———. 1979. "1974 and 1975 Preliminary Results of the Excavations at Selenkahiye Near Meskene, Syria." *AASOR* 44:97–112.

———, ed. 1988. *Hammam et-Turkman.* Vol. 1. Istanbul: Nederlands Historisch-Archaeologisch Instituut te Istanbul.

———. 1992. "The Beginning of the Middle Bronze Age in Syria." *Ägypten und Levante* 3:103–7.

van Zeist, W. 1984. "Palaeobotanical Investigations of Tell ed-Der." In *Tell ed-Der*, vol. 4, edited by L. de Meyer, 119–43. Leuven: Peeters.

van Zeist, W., and J. Bakker-Heeres. 1985. "Archaeobotanical Studies in the Levant 4: Bronze Age Sites on the North Syrian Euphrates." *Palaeohistoria* 27:247–316.

van Zeist, W., and S. Bottema. 1991. *Late Quaternary Vegetation of the Near East.* Beihefte zum Tübinger Atlas des vorderen Orients, series A no. 18. Wiesbaden: L. Reichert.

van Zeist, W., and W. Waterbolk-van Rooijen. 1992. "Two Interesting Floral Finds from Third Millennium B.C. Tell Hammam et-Turkman, Northern Syria." *Vegetation History and Archaeobotany* 1:157–61.

van Zeist, W., W. Waterbolk-van Rooijen, and S. Bottema. 1988. "Some Notes on the Plant Husbandry of Tell Hammam et-Turkman." In *Hammam et-Turkman.* Vol. 1, edited by M. van Loon, 705–15. Istanbul: Nederlands Historisch-Archaeologisch Instituut te Istanbul.

Voigt, M. 1983. *Hajji Firuz Tepe, Iran.* Philadelphia: University Museum, University of Pennsylvania.

von den Driesch, A. 1993. "Faunal Remains from Habuba Kabira in Syria." In *Archaeozoology of the Near East*, edited by H. Buitenhuis and A. Clason, 52–9. Leiden: Universal Book Services.

Wattenmaker, P. 1994. "Political Fluctuations and Local Exchange Systems in the Ancient Near East: Evidence from the Early Bronze Age Settlements at Kurban Höyük." In *Chiefdoms and Early States in the Near East: The Organizational Dynamics of Complexity*, edited by G. Stein and M. Rotheman, 193–208. Madison, Wis.: Prehistory Press.

Weber, J. Forthcoming. "A New Method for Metrical Distinction of Asses and Half-Asses."

Weiss, H. 1983. "Excavations at Tell Leilan and the Origins of North Mesopotamian Cities in the Third Millennium B.C." *Paléorient* 9:39–52.

Weiss, H., et al. 1993. "The Genesis and Collapse of Third Millennium North Mesopotamian Civilization." *Science* 261:995–1004.

Wiggermann, F. 1992. *Mesopotamian Protective Spirits: The Ritual Texts.* Groningen: Styx and PP Publications.

Wilkinson, T. 1990. *Town and Country in Southeastern Anatolia.* Vol. 1, *Settlement and Land Use at Kurban Hoyuk and Other Sites in the Lower Karababa Basin.* Chicago: Oriental Institute of the University of Chicago.

———. 1994. "The Structure and Dynamics of Dry-Farming States in Upper Mesopotamia." *CurrAnthr* 35:483–520

———. 1995. "Late Assyrian Settlement Geography in Upper Mesopotamia." In *Neo-Assyrian Geography*, edited by M. Liverani, 139–60. Rome: Universita di Roma "La Sapienza," Dipartimento di scienze storiche archeologiche e anthropologiche dell'antichita.

———. 1997. "Environmental Fluctuations, Agricultural Production and Collapse: A View from Bronze Age Upper Mesopotamia." In *Third Millennium BC Climate Change and Old World Collapse*, edited by H. Dalfes, G. Kukla, and H. Weiss, 67–106. Berlin: Springer.

———. 1998. "Water and Human Settlement in the Balikh Valley, Syria: Investigations from 1992–1995." *JFA* 25:63–87.

Wilkinson, T., and E. Barbanes. Forthcoming. "Settlement Patterns in the Syrian Jazira During the Iron Age." In *Syria in the Iron Age*, edited by G. Bunnens.

Wirth, E. 1971. *Syrien: Eine geographische Landerkunde.* Darmstadt: Wissenschaftliche Buchges.

Zaccagnini, C. 1995. "War and Famine at Emar." *Orientalia* 64:92–109.

Zeder, M. 1990. "Animal Exploitation at Tell Halif." *BASOR* Suppl. 26:24–30.

———. 1998. "Environment, Economy, and Subsistence in Northern Mesopotamia." In *Espace naturel, espace habité en Syrie du nord (10e–2e millénaires av. J-C.)*, edited by M. Fortin and O. Aurenche, 55–67. Bulletin of the Canadian Society for Mesopotamian Studies 33. Lyon: Maison de l'Orient Méditerranéen.

Zettler, R. 1997. *Subsistence and Settlement in a Marginal Environment: Tell es-Sweyhat, 1989–1995 Preliminary Report. MASCAP* 14. Philadelphia: Museum Applied Science Center for Archaeology, University of Pennsylvania Museum of Archaeology and Anthropology.

Zohary, D., and M. Hopf. 1984. *Domestication of Plants in the Old World.* Oxford: Oxford University Press.

Zohary, M. 1973. *Geobotanical Foundations of the Middle East.* Stuttgart: G. Fischer.